Paving ways for egg freezing: an unconventional solution for future family planning in Vietnam

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List of Acronyms

EF	Egg freezing
FLP	Female labour participation
OC	Oocyte cryopreservation
SEF	Social egg-freezing
WTA	Willingness to adopt
WTA_Problemcy	Willingness to adopt in case of unattainable natural pregnan-

Abstract

This research paper delves into the erratically ageing demographic structure of Vietnam, with a particular focus on Ho Chi Minh City to explore the solutions to the low fertility rates in this region. Specifically, the study brings forth a nuanced interaction between fertility, population policies, and the motherhood wage penalty. The study investigates the role of risk aversion, regarding career security, on women's willingness to adopt (WTA) social egg freezing (SEF) as a family planning option. Through anonymous cross-sectional surveys conducted amongst Ho Chi Minh City women aged 22 to 38, the study unveils a high level of awareness and openness toward SEF. Nominal and ordered logistic regression analyses further establish a positive correlation between risk aversion in career aspects and the inclination to adopt SEF both in general circumstances and in the hypothetical case of unattainable natural pregnancy. The findings contribute to the literature by providing insights into urban women's perceptions of family planning programs in Vietnam, applying risk aversion to non-financial behaviour, and expanding awareness of SEF beyond Western contexts. The paper concludes by discussing policy implications and suggesting avenues for future research.

Relevance to Development Studies

This topic brings relevant and valuable insights into Development Studies since it inspects the multitudinous intricate links between demographic trends, government policies, and individual decision-making under the concept of Behavioral Economics, with implications for economic development, gender equality, and reproductive autonomy. The findings can inform family planning policy frameworks to integrate the medicalization of assisted reproductive technologies into sustaining population growth and empowering women's human capital and reproductive rights.

Keywords

Social egg freezing, family planning policies, wage penalty, risk aversion, Vietnam

Chapter 1 Introduction[1]

Since 2006, Vietnam has been reaping the benefits from a demographic bonus termed as "gold population structure", which conveys that "for every two of working age people have no more than one dependents". More specifically, the dependency ratio of the country was recorded at 49.9%, marking the most optimal working population dividend (Nguyen & Tran, 2009). Optimistically, such a demographic window of opportunity is predicted to last until 2042 (The World Bank, 2021).

However, the ageing population has become a rampant phenomenon in the Southeast Asia region. For example, Vietnam's proportion of the population aged 65 and above currently holds the third position among the ASEAN nations, following Thailand and Singapore despite its income per capita being ranked sixth in the region. Reportedly, Vietnam is one of the fastest-aging countries in the world (VnExpress, 2023). On average, between 2009–and 2019, the annual population growth rate was 1.14%, whereas, for the elderly population, it surged to 4.35% (Vietnam UNFPA, 2021). This pace of ageing in Vietnam is more dramatic and premature than observed in other developed countries, rendering a highly salient prospect of "not getting rich before getting old" (Handong et al., 2020). By 2036, Vietnam will prospectively register itself into the transition from an "ageing" to an "aged" society (Vietnam UNFPA, 2021), indicating that the elderly make up 10-19.9% of the total population (World Bank 2021).

Vietnam's rapid population ageing is the result of low fertility rates (Teerawichitchainan et al., 2019), which, in a sanguine light, signifies the effective target and compliance of family planning policies in Vietnam.

In 1988, the Vietnamese government officially levied the two-child policy, which limits the maximum number of children per family to two children and aims at stabilizing the population growth rate at less than 2% (Council of Ministers, 1989). In addition, the policy also conveys emphasis on later first-birth age (22 for women and 24 for men), and longer birth spacing of children (three-year gap), except for women having their first birth at over 30) (Goodkind, 1995). In essence, the policy delivers the connotation that with fewer

[1] This research has been the outcome of an arduous yet meaningful journey that I learned a lot of from. With this, I would like to send my enormous gratitudes to Dr. Zemzem Shigute Shuka, my supervisor, whose unwavering support and reassurance had helped me enormously to keep me on the ground and continue the drive to complete this topic, which I eventually feel very very fulfilled to work on. I also want to sincerly thank Dr. Matthias Rieger since his lecture on Risk Aversion has inspired me to formulate this topic and his feedbacks at the seminar helped me arrive at the idea of willingess to adopt. Moreover, I would like to apprecite my family's constant support and my friends, especially my ECD classmates for the past year that we spent studying togetether. And last but not least, I would like to appreciate the respondents for taking their time to participate in my survey. Without them, this research would never get the necessary data to complete.

children, women can spend more time participating in the labour market, the living standards will be improved and economic growth will subsequently be achieved (Ngo, 2020). At present, the total fertility rate in Vietnam is 1.96 per woman and it is projected that there will be a continuous downward trend until reaching 1.85 in 2044 and then a plateau in 2049 (The World Bank, 2021). In 2021, there were 21 provinces (out of 63) with fertility rates lower than 2.1 and they concentrated mainly in the Southeast and the Mekong Delta regions (GSO, 2021). In particular, Ho Chi Minh City, the largest city as well as the economic centre of the country, located in the Southeast, recorded the lowest fertility rate (1.39 children per woman) (Doan et al., 2022). As a tangible effort, in 2020, the government passed Decision No. 588/QD-TTg to adjust the fertility levels accordingly, with an emphasis on maintaining the replacement fertility rate nationwide until 2030. In line with that, the Ministry of Health introduced Decision No. 2324/QD-BYT targeting low-fertility regions. Specifically, the decision advocates the advantages of having two children per couple, provides corresponding social support for such households and advises against delayed marriage and childbearing. Preferably, young adults should get married before 30 and women should have a second child before 35 (Doan et al., 2022).

Understandingly, highlighting the ages such as 30 and 35 stems from the concern about the critical point in women's fertility decrease and possible birth-related complications due to advanced maternal age (Garcia et al., 2018). However, the thirties marked a pivotal period for many women's careers and interruption due to child-having can cause a formidable hindrance to female labour participation (FLP) and progression (Goold & Savulescu, 2009). Besides, concurrently, the Vietnamese government should also take labour productivity improvement into account. Despite still benefiting from an abundant working-age population, Vietnam's labour productivity remains low compared to other Asian neighbours (The World Bank, 2021). Yet conversely, the FLP rate in Vietnam has been maintained at a high level for over twenty years and has even surpassed the top-performing advanced economies (Banerji et al., 2018). For instance, in 2019, 70.9% of women in the working age participated in the labour market (Barcucci et al., 2021). Since the movement of workers is already noteworthy, the Vietnamese government should intensively prioritize raising human capital especially in women to holistically improve labour productivity. Nevertheless, studies have demonstrated empirical evidence that having children leads to an immediate but temporary decline in productivity in both the job market and human capital investment (Wilde et al., 2010), or having children or negative effects on paid labour force participation amongst women under 35 in low and middle-income countries (Aguëro & Marks, 2011).

Given Vietnam's current economic situation, population planning programs should balance women's inspirations for human capital investment and career advancement simultaneously with sustainable population growth and fertility preservation. In recent times, oocyte cryopreservation (OC) and vitrification, or egg freezing in colloquial terms have gathered increasing attention and debates about it being a measure for hedging the risk of age-related infertility (Myers, 2017). This technique was first invented to cater to female cancer patients who would be exposed to sterilization due to chemotherapy and relat-

ed treatments (Cobo, A. & Garcia-Velasco, 2016). Over time, indications of EF under non-medical and social conditions are becoming more common. This medicalization option might provide women with buying "breathing space" (Dondorp et al., 2012) or extra "biological time" (Lockwood & Johnson, 2015) given the pressure arising from simultaneous life projects within a short timespan of youth. Perhaps, Vietnamese population policies can incorporate the education or introduction of assisted reproductive technology (ART) that aids young women to proactively decide on the "right time" to conceive amidst the struggle of work-family conflict (Goold & Savulescu, 2009).

Fertility decision-making is often theoretically ascribed to the notion of uncertainty, particularly with the attitude toward risks. Along with this topic theme, risk preference has been incorporated in studies about sexual health behaviours (Björkman et al., 2018) marriage timing (Schmidt, 2008), potential spousal qualities (Spivey, 2010) or child-having decisions (Bellani & Arpino, 2022). Yet, there has not been a study about the link between risk aversion and ART treatment adoption. Additionally, risk aversion has been explored through the lenses of demography (Halek & Eisenhauer, 2001), based on seven measurements, in which there is a hypothetical scenario based on the risk preference parameters of Health and Retirement Study (Barsky et al., 1997), yet with concrete values and adjustments to the weights of possibilities. Besides, due to the argument that risk-taking propensity is context-specific and multidimensional (Schmidt, 2008), the measures constituting this study's risk aversion index involved more detailed responses regarding the workplace environment and career priority of the respondents with the attempt to generate a convincing narrative in applied research.

Furthermore, the study clarified WTA into three nuances: viewing as a viable planning option, likelihood to opt for treatment in general, and likelihood to opt for treatment in case of natural conception inability. Within the scope of this study, anonymous cross-sectional surveys were conducted with the target respondents being women in Ho Chi Minh City, aged 22 to 38 and eventually, 253 answers in total were collected. The econometric approach of logistic regression and ordered logistic regression were employed to generate the results and findings.

The results show there is a highly optimistic view and openness toward SEF amongst women in Ho Chi Minh City. Specifically, 94.47% of women have heard about SEF before. Moreover, 87.75% of women asserted that SEF gives them the impression that motherhood at an older age is possible, 77.08% said that they do not feel any social stigma surrounding SEF and 91.3% responded that they would recommend SEF to someone else. The main research question of the study was also confirmed. Risk aversion regarding career has statistically significant and positive effects on the WTA SEF along all three nuances. Firstly, every one score increase in risk aversion regarding career will increase the respondent's viewing of SEF as a viable family planning option by 1.19% points. Secondly, every one score increase in risk aversion regarding career will lead to an increase in 0.97%, and 1.04% points in the "likely" and "very likely" probability respectively when it comes to the likelihood of opting for SEF in general. Lastly, when it comes to the situation that natural pregnancy is unattainable, every one score increase in risk aversion regarding career will

lead to an increase in the "likely" and "very likely" probability by 0.66% and 1.19% points percentage points, respectively.

This study contributes to three bodies of literature. Firstly, it inspects the perception of young women in urban regions with low fertility rates regarding population and family planning programs in Vietnam. Such findings consolidate the distinct socioeconomic factors of Ho Chi Minh City or the South of Vietnam (Nguyen & Nghiem, 2022) and bring forward some contrasts to the regular narrative of family planning policies' effectiveness in rural areas with low education (Ngo, 2020). Besides, they signal the early gaps between the desire and intention for marriage and childbearing, which could inform family planning policies timely to facilitate young adults to attain fertility intentions (Dommermuth et al., 2015). Secondly, it brings another example of applying risk aversion to nonfinancial behaviour, which is often disputed among psychologists (Schmidt, 2008). The risk aversion index of this study included more situational and explorative aspects to explain the decision of fertility preservation and medicalization, specifically under the context of career and FLP. Lastly, it contributes to the widespread awareness of SEF outside the previous scope of Western countries and opens new space for research on this topic in Vietnam or Asia.

The research paper is organized as follows. Chapter 2 presents the definitions and literature review of concepts included in the study, which are SEF, family planning program, wage penalty and risk aversion; Chapter 3 describes the methodology, the survey design and the Risk Aversion Score; Chapter 4 explains the survey results, Chapter 5 presents the outcomes the nominal and ordered logistic regression and lastly Chapter 6 concludes and discusses policy implications and areas for future research.

Chapter 2 Literature review

2.1. Social egg freezing

Egg freezing is a non-technical term for oocyte cryopreservation and vitrification. This is an assisted reproductive technology (ART) that was first invented to cater to female cancer patients who would be exposed to sterilization due to chemotherapy and related treatments. In the context of this study, the term "EF" (EF) entails several interchangeable keywords such as "social egg freezing", "non-medical egg freezing" (NEF), "elective egg freezing" (EEF), "EEF for fertility preservation", "EF for age-related fertility decline", or "OC for age-related fertility loss. All these terms refer to the voluntary choice of EF treatment for non-medical or social reasons (Bozzaro, 2018).

In the last decade, prestigious medical organizations such as the American Society for Reproductive Medicine (ASRM, 2018) and the European Society for Human Reproduction and Embryology (ESHRE, 2012) have confirmed the ethical permissibility and safety of this method, asserting that it is no longer in the experimental stage. On a more sanguine note, the Canadian Fertility and Andrology Society (CFAS) approved of this method as a strategy "to preserve fertility in the face of anticipated decline... through the natural ageing process." (Baylis, 2015). Besides and more importantly, new technologies have rendered high success rates for IVF treatment. Up to now, there are two methods of OC, which are slow freezing and vitrification (or fast-cooling), with the latter reaping higher success rates. Frozen eggs through vitrification reportedly result in a 91.2% survival rate, compared with 73.2% through the previous slow-cooling method (Goold & Savulescu, 2009). To gather an ample number of eggs, women undergo multiple rounds of hormonal stimulation. The retrieved eggs are then immediately vitrified and stored in liquid nitrogen at -196 degrees Celsius (Cobo & Garcia-Velasco, 2016). The whole procedure normally spans around two weeks and results in the retrieval of circa 10 eggs per cycle. For a viable prospect of pregnancy, approximately 20 egg cells are needed, implying that more than one cycle must be prescribed to obtain a sufficient number of eggs. Nevertheless, the number of eggs retrieved per cycle and the total quantity needed are dependent on factors such as the woman's age, egg quality, and indicators of ovarian reserve (Kostenzer et al., 2021). Subsequently, when the need to conceive emerges, the frozen oocytes are thawed, fertilized with sperm and cultured in laboratory conditions. Eventually, the embryo is transferred to the uterus of the intending mother (Bozzaro, 2018).

Since the process of egg collecting involves hormonal injection and vaginal egg retrieval, some risks might appear, such as ovarian hyperstimulation syndrome, future IVF-related risks (multiple pregnancies, gestational hypertension, premature delivery, and low birth weight infants), and advanced-aged pregnancy risks (premature delivery, operative delivery, multiple pregnancies, low birth weight, gestational diabetes, and hypertensive disorders of pregnancy) (Ghazeeri et al., 2023). Nevertheless, the chances of such complications are highly unlikely and completely preventable (Dondorp et al., 2012). There are also concerns about congenital anomalies ensuing from vitrified eggs. Yet,

studies have substantiated no differences in such aspects between natural conception and IVF of OC (Noyes et al., 2009).

In Vietnam, Decree 10/2015/NĐ-CP regulates that egg storage and IVF must be performed in four types of medical examination and treatment establishments: "state obstetrics or provincial or higher level obstetrics-paediatrics establishments; private general hospitals with obstetrics or obstetrics-paediatrics departments; private hospitals specializing in obstetrics or obstetrics-paediatrics; and hospitals specializing in andrology and infertility" (Zico Law, 2021). The law does not put any restriction on the women's age, marital status, or storage duration upon the process of egg retrieval or fertilization, unlike some neighbouring countries. For instance, in Singapore, only women aged under 38 are allowed to freeze their eggs but must be married when wishing to utilize them (Chin, 2022). Thailand also forbids single women from conceiving with frozen and sets a window of storage for 10 years (Capps et al, 2014). At the moment, public health insurance in Vietnam does not cover the costs of EF or IVF under non-medical indications. The expenses must be covered personally through contractual agreements with the medical facility. If the storage fee is unpaid for six months, the medical establishment holds the right to dispose of the stored eggs (Zico Law, 2021).

Until now, the majority of articles published on this SEF treatment revolve around several arrays of topics, namely the medical outcomes, the cost-effectiveness analysis, the sociological and ethical aspects, the attitudes and reasons for opting for SEF, post-treatment thoughts and hindsight regrets, opinions on funding options and awareness of SEF. Especially, this topic has been conducted widely among women who are at different phases of the OC procedure in Western countries, for instance, in Australia (Hammarberg et al., 2017; Pritchard et al., 2017), Belgium (Stoop et al., 2011), Turkey (Göcmen & Kilic, 2018), The US and Israel (Inhorn et al., 2018) The UK (Jones et al., 2019) and The Netherlands (Kanters et al., 2022), etc. The studies all concluded with similar findings that women involuntarily opting for SEF were dominantly heterosexual, socio-economically advantaged, highly educated, unmarried and the mean or median age at the time of treatment was over 36.

Due to the recurrent demography of women pursuing SEF, mainstream media has imposed a depiction of this group as selfishly career-driven, proactive and forward-thinking women who plan ahead or are submitted to a male-dominated society where they cannot strike a balance between parenthood, education and occupation (Inhorn et al., 2018, Martin, 2010). However, Western literature has debunked these accusations by providing reality narratives of the motivations for SEF. Specifically, the absence of a romantic partner (Hammerberg et al., 2017; Hodes-Wertz et al., 2013; Stoop et al., 2014) and the ensuing pressure of the "biological clock" are the primary reasons (Göçmen & Kilic., 2018; Garcia-Velasco et al., 2013; Kostenzer et al., 2021). In more detail, Baldwin et al., (2015) enumerated the five most common reasons among women undertaking SE, namely "running out of time", being single and "panic partnering", combatting future unwanted childlessness, having existing fertility-related problems, and shaping pivotal life events (Baldwin et al., 2019). Comparably, Inhorn et al., (2018) provided two groups of reasons, for women without partners and with partners. In general, they all converge on the matter of lacking a serious romantic partner who is ready, capable, or shares the desire for

parenthood. Surprisingly, empirical evidence has highlighted the insignificance of career pursuit as the deliberate motive for delaying childbearing, implying that women's decision-making process toward SEF is oversimplified and subjected to prejudice (Baldwin et al., 2018; Inhorn et al., 2018; Göcmen & Kilic, 2018; Kostenzer et al., 2021).

Moving forward from the repeated drivers for SEF, advocates of this ART have proposed that it is also a measure where women can practice their "responsible reproductive citizenship" since the reproduction duty itself is innately gendered (Carroll & Krolokke, 2018). In particular, men have the choice to delay fatherhood until whenever without encountering overwhelming criticism or disapproval (Goold & Savulescu, 2009). On top of that, sperm cryopreservation has been long-existent and is now commercially available for men in athletic fields (Dondorp et al., 2012). On the other hand, women are responsible for both overseeing their reproductive window and acting upon unanticipated future infertility (Carroll & Krolokke, 2018). As a result, it is unjust to debate against the emancipation of women from the limited fecundity timeline, which invariably overlaps with the period where they address important education and career growth (Goold and Savulescu, 2009). Therefore, it is optimal when women are simultaneously informed about the health advantages of early childbearing and the open possibilities when they long for extra time (Dondorp et al., 2012). More crucially, women must be made fully aware that OC does not guarantee miraculous insurance against age-related fertility decline after 35 (Lockwood & Johnson, 2015). In essence, to make the best decision of whether to preserve fertility, women should have access to adequate information about the treatments.

Consequently, a growing branch of research has been reporting the level of awareness and attitudes toward SEF has been carried out in many countries and respondent groups. Table 2.1 includes the summary of these key empirical studies around the knowledge and perception of SEF, which can also extend to funding opinions or comparisons versus MEF.

Table 2.1. Literature about knowledge and perception of SEF

#	Authors	Country	Year	Research topic	Respondents' characteristics	Sample size
1	Zhou et al.,	China	2022	Perceptions and attitudes towards EEF	Women (17-35 years)	750
2	Tozzo et al.,	Italy	2019	Knowledge and attitudes on SEF	Female students (18-35 years)	930
3	Lallemant et al.,	Denmark and the UK	2016	Knowledge and attitudes on MEF and SEF	Women (above 18 years)	973
4	Ghazeeri et al.,	Lebanon	2023	Knowledge and attitudes toward fertility preservation	Women (18-39 years)	402
5	Gambadauro et al.,	Sweden	2023	Acceptance and willingness to pay for MEF versus SEF	Female students (19-35 years)	270
6	Tan et al.,	Singapore	2014	Mindset and attitudes toward fertility and SEF	Female medical students	129
7	Daniluk et al.,	Canada	2018	Beliefs and knowledge about MEF and SEF	Childless women (18-38 years)	500
8	Stoop et al.,	Belgium	2011	Intentions and attitudes toward non-medical OC	Women (21-40 years)	1049
9	Fauser et al.,	France, Germany, Italy, Spain, Sweden, the UK	2019	Beliefs and attitudes toward funding of ART	Men and women (above 16 years)	6000
10	Yu et al.,	The US	2016	Knowledge, attitudes, and intentions toward fertility awareness and OC	Obstetrics and gynecology resident physicians	
11	Kaplan et al.,	Denmark and Israel	2022	Views on financing SEF	Female students	569
12	Kostenzer et al.,	Austria	2021	Viewpoints on EF	Women (25-62 years)	48

The majority of articles published on the attitudes toward SEF are set in developed Western countries. Notwithstanding the research presence in Singapore and China, these two countries either have strict SEF rules (Chin, 2022) or still ban its implementation (Zhou et al., 2022). Evidently, there is a gap in studies about the public opinions on SEF conducted amongst Asian women from lower middle incomes. Therefore, this study's investigation on the WTA SEF amongst Vietnamese women enacts more informed decisions amongst women of reproductive age and conditions more future-forward perspectives in family planning, to align with the country's cultural and socioeconomic determinants.

2.2. Family planning programs

Family planning programs became widely recognized and implemented starting in the 1970s and 1980s, to encourage responsible and autonomous fertility control (Mwaikambo et al., 2011). Family planning programs in Vietnam, like in other countries, were initially implemented to target households with a high number of intended and desired children (Agüero & Marks, 2011). In 1988, Vietnam's one-or-two-child policy started coming into force amidst the country's facing the prospect of overpopulation with a meagre GDP per capita of $130 (Council of Ministers, 1989). Before that, the two-to-three-child norm has been enforced in the North since the 1960s and in the South since the late 1970s (Goodkind, 1995). At the time, the goal of such family planning policies was to tame the population growth rate under 2% per annum (Ngo, 2020). In parallel with the policy introduction, the government provided open access to contraception and abortion, and incentivized women to increase labour participation given fewer children, altogether culminating in economic growth (Council of Ministers, 1989). After 17 years of the enforcing two-child policy, Vietnam's fertility rate precisely dropped for the first time to the replacement fertility rate, at 2.1 per woman, in 2005 (Nguyen & Nghiem, 2022). Ever since, the government has been exerting efforts to contain this rate. Yet the total fertility rate in 2023 was 1.95 children/woman, continuing to decrease compared to 2022 (2.01 children/woman). women) and below replacement fertility rates (VnExpress, 2023). Notably, the Southeast and Mekong Delta are the two regions with the lowest fertility rates, at 1.56 and 1.8 children/woman, respectively (GSO of Vietnam, 2019).

Family planning policies themselves projected the regional differences in the exertion of fertility programs (Council of Ministers, 1989). Social research has indicated that within the Red River Delta region, declined fertility rates are featured with the effectual application of population policies, whereas in the Southern region, quick-paced social and economic development play a markedly substantial role in reduced birth rates, rather than family planning initiatives (Ngo, 2020). The Southeast thus represents a unique trend compared to the whole country with its recurrent low total fertility. Some primary observations have been highlighted to explain this problem: the Southeast records the highest population of unmarried adults (GSO OF VIETNAM, 2019). Correspondingly, unmarried and young (18-24) women are the two groups considering the lowest mean desired and intended family (Nguyen & Nghiem, 2022). There is also an evident disparity between the mean desired family size and the mean intended family size in the Southeast (2.4 versus 2.07) (Nguyen & Nghiem, 2022). The Vietnamese government has then seen this phenomenon as an imperative to introduce a new population strategy.

On April 28, 2020, Decision 588/QD-TTg was passed, endorsing the fertility rate adjustment program aiming for 2030 (Cổng Thông tin điện tử Chính phủ, 2020, accessed on 9th January, 2023). The overarching objective is to tackle the decline in fertility rates and manage the demographic issues resulting from an increasingly ageing population when the elderly population (above 65 years) will make up for 7 to 9.9% of the total population (The World Bank, 2021). Precisely, the strategy is to uphold the national replacement fertility rates,

concurrently decreasing the fertility in provinces where the total fertility rates exceed 2.1 and raising fertility in the ones with TFR under 1.8 (Nguyen & Nghiem, 2022). In reverse to the previous message of "one or two children" (Goodkind, 1995), the Decision now encourages each couple to have two children and lifts the limit on the third child in low fertility regions (Doan et al., 2002). Moreover, couples in such regions are provided with social support in terms of family-building and child-rearing services (Doan et al., 2022).

Interestingly, the Decision captured the attention and provoked mixed public discussions amongst Vietnamese youngsters through its explicit encouragement of getting married before 30 and women preferably having two children before 35 (VnExpress, 2020). To concretize the Decision, the government offers a wide range of financial benefits and childbearing/rearing-friendly conditions for two-child couples, for instance, while enhancing the accountability of individuals who remain single or delay marriage in terms of their social and community contributions (Doan et al., 2022). Despite the clear implications of health advantages, the age indications are fraught with mixed reactions. Conversely, the thirties signify a vital period of career advancement for numerous women, and taking a break to start families or have children meanwhile can considerably hamper future professional trajectory and income growth (Goold & Savulescu, 2009). Besides, with Vietnamese high FLP, interruption in the workforce or hindrance to human capital investments due to childbearing will not aggregate an unfavourable environment for boosting labour productivity, which is concurrently an intractable issue of Vietnam's emerging economy (The World Bank, 2021; Banerji et al., 2018). Correspondingly, for women in the Southeast, concerns about high expenses strenuous efforts of raising children and childcare, health and appearance impacts, and job opportunity loss are also the principal causes of delayed marriage and childbearing (Nguyen & Nghiem, 2022). Ostensibly, the new family planning decisions might not address apropos solutions that adapt to the lifestyle of women in modern times.

In retrospect, the preliminary service delivery of family planning programs is through public health interventions, namely with the introduction of contraception. The promotion of contraceptive use in the past decades has enabled women's control over unwanted fertility (Mwaikambo et al., 2011). Contrarily, with the contemporary trend of postponed motherhood and low birth rates, pubic health could also be utilized, yet in the opposite direction, to intervene in unwanted infertility (Bozzaro, 2018). Back in the day, contraceptive pills were not always associated with medical indications (Stoop et al., 2014). Yet, gradually, they have set a new landmark for female reproductive autonomy, allowing them to grasp the opportunities of education, work, and professional promotion, which further contribute to economic development as a whole (Bozzaro, 2018). Similarly, SEF as the name suggests, is not considered strictly medical at the moment yet it has the potential to alert women's knowledge about their fertility at an early phase and act on realizing their desired childbearing intention when ready (Dondorp et al., 2012). In recent times, world-renowned corporations such as Facebook and Apple, JP Morgan, Microsoft, Google, and Intel have incorporated SEF in the employee benefits package (Kaplan et al., 2022). Perhaps, it is time that governments include raising awareness and recommending OC treatments for unmarried women over 30 as a cushion for

later family planning plans. The main argument is that it offers women flexibility in settling down and getting pregnant later in life when they and their partners are financially and emotionally stable to raise children (Mintziori et al., 2019).

2.3. "Wage penalty" and "risk aversion"

FLP and higher educational attainments are frequently attributed to parenthood postponement, which has been thoroughly discussed, in the 'work-family conflict' literature (Mills et al., 2011). The terminology that captures the inverse relationship between FLP and childbearing is the 'wage penalty', which refers to the decrease in women's income, caused by diminished productivity, as a consequence of childbearing or childrearing (Taniguchi, 1999). Neoclassical economists posit wage penalty typically occurs since mothers earn reduced wages due to them allocating more time to familial responsibilities over their paid employment (Taniguchi, 1999). Several studies have exhibited the adversarial effects of career interruptions on income, regardless of the duration (Albrech et al., 1999) or regarding male-dominated fields (Mincer & Polachek, 1974). In more numerical details, a year of delayed motherhood increased women's career earnings by 9%, their work experience by 6%, and average wage rates by 3% (Miller, 2009). When factoring in the number of children, there is evidence of a 7% decrease in wages per child without controlling for work experience and 5% when controlling (Budig & England, 2001).

Besides the impediments to wage attainment, the wage penalty also covers the boundness to skill atrophy as a ramification of childbearing, which can be explicated from both the demand and supply sides. To be specific, mothers will halt from accumulating job-related skills during maternity leave and the employers also provide fewer training and promotion chances at the same time (Miller, 2009). Moreover, research has illustrated that skill depreciation arises for women who changed jobs after the career break (Baum, 2002) and Anderson et al., (2002) further highlighted that skilled or college-educated women incur the highest penalty (15%) due to the years out of labour for childcare (Anderson et al., 2002). Similarly, Wilde et al., (2010) denoted working mothers will experience postnatal wage growth inertia, which is most clearly observed among high-skilled women (Wilde et al., 2010). In terms of job characteristics, Adda et al., 2007 categorized them into abstract, manual, and routine and concluded women in abstract occupations where job requirements evolve rapidly, suffer from the worst opportunity costs and skill depreciation rates due to childbearing intermittency (Adda et al., 2017). Empirically speaking, women with high education levels carry steeper age-income profiles or are more inclined to seek a high-ranking career path that features more responsibilities, and independence, hence good compensation (Mills et al., 2011). In essence, professional and educated women take more time to settle into their careers and, thus tend to get married and have children later due to the prospective financial impacts of childbearing (Wilde et al., 2010).

Manifestly, there is a considerable intertwinement between childbearing and overall work performance. As Vietnam is a lower-middle-income country with an ageing population, population planning policies thus should be coupled

with raising labour productivity and labour force outturns for a sustainable economic outlook (Wei et al., 2019). More importantly, it is noteworthy that the FLP rate of Vietnamese women of working age (15-64) is constantly high, more than 70% (Banerij et al., 2018). This figure is highly acclaimed since it surpasses the average FLP rate of 21 advanced economies (Banerij et al., 2018).

Therefore, given the already abundant workforce, productivity can be improved to a greater extent through human capital investment (The World Bank, 2021). In terms of higher education performance, Vietnam's Gender Parity Index in tertiary school enrollment was 1.06 in 2022 (World Bank, 2023, accessed on 11th January, 2023). In essence, this measure reflects the equitable access to education between males and females and GPI for gross enrollment ratio in tertiary education demonstrates the proportion of women to men enrolled at higher education (The World Bank, 2024). The outcome of 1.06 thus marks that there are now more Vietnamese women attending tertiary level than men. However, given the aforementioned impacts of childbearing on skillsets and wage outcomes, the current family planning programs' marital and childbearing age indications might contradict the pace of education and career development of Vietnamese women. For instance, through an OLS model, Taniguchi, 1999 projected that child bearers aged 20-27 experienced a substantial wage penalty (3.5%) while such patterns were not found in late mothers (aged 28+). Moreover, postponed marriage and first births result in decreased childbearing costs and increased earnings, especially among college-educated women (Taniguchi, 1999). Compared to childless women or early mothers, women with university degrees who marry late have 43% and 21% more earnings, respectively (Amuedo-Dorantes & Kimmel, 2005).

The personal decisions between career, family and fertility, correspondingly, factor in the calculation of expected utility maximization given future uncertainty (Sheran, 2007). In such stochastic choices, risk aversion exerts the tendency to ensure gains (Kahneman & Tversky, 1974). Gains translated into the context of FLP can be comprehended as career success, which is commonly regarded through objective and self-referent measures such as earnings, salary growth, promotions, job status, and professional goals (Heslin, 2005). Conversely, research weighing between career and fertility timing has put forward several risky prospects denominating "losses" such as wage penalty, skill depreciation, and work-family conflict while women themselves have the biological risks of declined fecundity. Regarding loss, risk aversion refers to the unwillingness to engage in activities that lead to a considerable possibility of loss or do not return assured benefits (Stefánsson & Bradley, 2019).

Attitudes to risk have been applied in various studies on fertility behaviours either directly, for instance, marriage and childbearing timing (Schmidt 2008), desirable spousal characteristics (Spivey, 2010), having (another) child (Bellani & Arpino, 2021) or indirectly, such as sexual health behaviours (Björkmann et al., 2018) and the employment type or sector (expounding the assumption that mother autonomously chooses the type of job that conditions them spending more family and childcare time) (Mauro & Musumeci, 2011; Dong, 2017). Coincidentally, Barsky et al., (1997)'s survey measures of preference parameters focusing on risk tolerance in the Health and Retirement Study were applied by Schmidt, 2008; Spivey, 2010; Mauro & Musumeci, 2011 and Dong, 2017. Specifically, the questions in the survey establish risk preference

by hypothesizing that the participant is the main family income earner and testing individual willingness to engage in a sequence of gambles over lifetime income (Barsky et al., 1997). Due to the applicability of these risk tolerance measures, the study will also incorporate Barsky et al., (1997)'s preference parameters, yet with adjustments to the probability weights assigned to different values. Originally, the gambles were formulated as follows:

> Suppose you had a job that guaranteed you income for life equal to your current, total income. And that job was (your/your family's) only source of income. Then you are given the opportunity to take a new, and equally good, job with a 50–50 chance that it will double your income and spending power. But there is a 50–50 chance that it will cut your income and spending power by a third. Would you take the new job?".

Subsequently, a respondent who is willing to accept the risky job will be offered a riskier job and on the contrary, one who turns it down will be asked about the safer one (Barsky et al., 1997). Due to the extensive applicability of this risk tolerance parameter set, the study will also employ it, yet with adjustments to the probability weights assigned to different income values.

Furthermore, as observed, there has been no study that links risk aversion with the likelihood of pursuing ART in general or SEF in particular. SEF as a precautionary measure against fertility decline, is to what extent, probabilistic insurance since treatment receivers pay a premium to minimize the unwanted occurrence of infertility while fully knowing that chances of conception failures persist (Kahneman & Tversky, 1974; Goold & Savulescu, 2009). Along the topic of insurance, risk aversion can be deduced when an individual foresaw an imminent risk and the availability of insurance against it, and they are keen to insure (Kőszegi & Rabin, 2007). Yet, in explicating nonfinancial behaviours, risk aversion tends to be criticized by psychologists as a general tendency rather than being context-specific and suitable for practical interpretations (Schmidt, 2008). Through a simple example, Stefánsson & Bradly (2019) illustrated that "someone who is risk averse concerning money will disprefer a gamble yielding either $0 or $100 with equal probability to getting $50 for sure" (Stefánsson & Bradly, 2019). Accordingly, to highlight the relevance of FLP, this study examines risk aversion regarding career security. Essentially, the main hypothesis of this study is that the more risk-averse regarding career security a woman is, the more likely that she will adopt SEF to preserve future fertility. The study proposes that the motivation to inspect the relevance between risk aversion regarding career security and the WTA SEF is rendered solid and relevant for applied research.

Chapter 3 Methodology and Data Collection

This research paper employs a cross-sectional online survey that consists of 88 questions to study the effect of risk aversion regarding career security on the WTA SET. The survey was open for one month, from 23rd October to 22nd November and distributed through anonymous links on social media, e.g. Facebook. The valid responses are with the following inclusion criteria: 1) Being a biological woman; 2) Living (as in having a registered address) in Ho Chi Minh City and 3) Being aged between 22 to 38. In the end, the sample includes 253 responses.

The survey commences with an information page about the title that introduces the purpose and the author of the research, and explains how the answers will be stored and analyzed. There is also cautionary advice that there will be questions about religion, sexual orientation and marital status that might be deemed sensitive. Before participating in the questionnaire, all respondents were asked to confirm having read, agreed and understood the research purpose and survey terms and conditions. Lastly, all must verify that they hold the right to stop answering at any time without giving any reasons and that participation is completely voluntary.

This chapter further details the design of the sample size and the survey, the data collection procedure, the construction of risk aversion regarding the career security index and the econometric approach to analyze the data.

3.1. Sampling design and data collection

The research conducted a survey in Ho Chi Minh City, the largest city in Vietnam, which is located in the Southeast region. Both Southeast and Ho Chi Minh City are the regions and municipality that record the lowest fertility rates (1.56 and 1.39, respectively) (GSO OF VIETNAM, 2019). Given the studied context of fertility intention and SEF perception, the survey additionally set the target respondent group as women aged from 22 to 38. Regarding the starting age, the family planning policies stipulated the minimum childbearing age at 22 for female government cadres and 19 for other women (Council of Ministers, 1989). Therefore, to allow for inclusivity of childbearing perceptions regardless of occupation, 22 was selected as the lower bound. Alternately, the closing threshold of 38 years was determined as multiple studies have substantiated that OC for age-related fertility loss should not be recommended after this age (Dondorp et al., 2012; Hodes-Wertz et al., 2013; CIl et al., 2013) or it represents the cut-off point for age-cost-effectiveness (Argyle et al., 2016; Devine et al., 2015)

According to the latest Completed Results of the Vietnam Population and Housing Census published in 2019, Ho Chi Minh City's total population was 8,993,082 and the female population was 4,611,840 (GSO OF VIETNAM, 2019). The Census provided the detailed population of four age groups that fall within the target respondent scope of this study, namely 20-24, 25-29, 30-34 and 35-39. Since there were no exact numbers for the age groups 22-24 and 35-38 of Hochminh City females, the sample size calculation was based on the

assumption that each age contributes the same proportion to the age group structure. In general, the population of the studied age group 22-38 was approximately 1,563,914 people. The detailed figures for the population of the target ages are presented in Table 3.1.

Table 3.1. The population of the target ages

Age group	Population	Age group	Population
20-24	427,929	Assumed 22-24	256,757
25-29	491,662	25-29	491,662
30-34	472,356	30-34	472,356
35-39	428,924	Assumed 35-38	343,139
Total	**1,820,871**	**Total**	**1,563,914**

Source: Completed Results of the 2019 Viet Nam Population and Housing Census (GSO OF VIETNAM, 2019)

The survey was active for one month through Qualtrics' anonymous links distribution[2]. The survey was officially launched on Facebook on 23rd October and later closed on 22nd November. Due to inclusion criteria, the study employed the snowball sampling method through the connections of friends, mutual friends and agents on social media. This method is beneficial to cover the whole geographic scope of Ho Chi Minh City (16 urban, 6 sub-urban districts and 1 municipal city). Succinctly, online snowball sampling accommodates increasing the sample size while being time and cost-effective (Baltar & Brunet, 2011).

In total, 409 respondents, of which 291 respondents completed more than 50% of the survey and there were 79 invalid participants (13 not identifying as biologically female, 19 not living in HCMC, 16 aged younger than 22 and 22 aged older than 38). Given the population size, the sample size was subsequently computed with the confidence level set at 95%, the margin of error at 5% and population proportion varying around 20-21% to factor in the fluctuations within the actual population. The quantity for the final sample size is between 246 and 255 respondents. Through further checking the survey progress, 253 respondents (61.85% retainment rate) were included in the survey for having completed at least 92% of the survey.

3.2. Survey design

The questionnaire consists of 88 questions, divided into six sections, namely Demographics (17 items), Labor and Education (13 items), Career-related Risk Aversion (10 items), Hypothetical Scenarios (6 items), Marriage and Childbearing Perceptions (35 items), and Awareness of SEF and WTA (12 items). The questions were also formulated in different manners: yes-no ques-

[2] To incentivize the response rate, 25 rewards of 400,000 VND worth each was arranged randomly to participants. Only those who wanted to join the lottery was asked to provide names and contact information, the rest was anonymous.

tions, multiple-choice questions (both single-select options and multi-select options), open-ended questions, matrix questions, ranking questions, rating questions, and Likert-scale questions. The comprehensive survey can be found in Appendix A.

In brief, the section "Demographics" gathered information about sexuality, age, marital status, residence, ethnicity, religion, sexual orientation, number of children and siblings, parents' number of siblings and household status. "Labor and Education" asked about working status, working experience, latest or current employment type, sector and educational requirement, highest completed education level, years of schooling, intention of higher education level pursuit and parents' education level. Specifically, the section "Career-related Risk Aversion", "Hypothetical Scenario" and two questions from "Marriage and Childbearing Perceptions" were compiled to construct the index of risk aversion regarding career security. The detailed explanation of this index computation will be explained in the following sub-chapter 2.3. Later, the following section commenced with inquiries about the age of marriage, first birth and last birth of the respondent's mother. It also posed an extensive range of questions about individual desire and intention, perceived norms and realization conditions concerning marriage and fertility. Moreover, there were explorative questions about viewpoints on single motherhood, reasons why women do not plan to get married or have children and knowledge about current family planning policies. Lastly, the final section "Awareness of SEF and WTA" enquired about the awareness, impression and attitudes toward SEF.

As the last two sections aimed to exploit in depth the respondent's level of fertility knowledge and Vietnamese distinct narratives of marriage and childbearing plans, this study consulted the published surveys of scientific and sociological papers. For instance, the four options: 18–28 years; 29–34 years; 35–38 years and at more than 38 years were extracted from Hodes-Wertz et al., (2013) for the questions Q.71, Q72, Q81 and Q83 (see Appendix A) (Hodes-Wertz et al., 2013). Likewise, for Q.84, on asking to rank the order of method preference for getting pregnant, the four items, natural conception, assisted reproductive technology, adoption and not wanting children were cited from the same study (Hodes-Wertz et al., 2013). In the context of Vietnam, the option "surrogacy" was added in this study survey since altruistic gestational surrogacy amongst relatives has been allowed since 2015 (Hibino, 2019). In addition, for the explorative muti-select questions Q53 (necessary conditions to get married) and Q74 (fines when giving birth to a 3rd child), the choices were consulted by Nguyen and Nghiem, 2022.

3.3. Risk aversion regarding career security index

To render the explanation more concise, in the following parts, risk aversion regarding the career security index will be shortenedly referred to as risk aversion score". Overall, the risk aversion score is the sum of seven indices: gamble score (min=1, max=6), career priority score (min=1, max=6), career characteristic score (min=0, max=7), working status score (min=0, max=2), workplace discipline likelihood score (min=1, max=5), career versus marriage score (min=0, max=2) and career versus children score (min=0, max=2). Each

respondent possesses an individual risk aversion score within the range of 3 to 30. According to Spivey (2011), there are four categories of risk aversion: very strongly risk averse, strongly risk averse, moderately risk averse and weakly risk averse. Correspondingly, the score distribution for the four categories will be as follows[3].

Table 3.2. The score distribution of four risk aversion levels

Category	Score distribution
Weakly risk averse	3 - 9
Moderately risk averse	10 - 16
Strongly risk averse	17- 23
Very strongly risk-averse	24 - 30

Source: Own Survey 2023

In the sample size, the risk aversion score ranges from 8 to 24. Based on the aforementioned distribution, there are 10 respondents (3.95%) who are weakly risk averse, 143 (56.25%) moderately risk averse, 98 (38.74%) strongly risk averse and 2 (0.79%) very strongly risk averse. More details can be found in Table 3.3.

Table 3.3. Tabulation of Risk Aversion Score

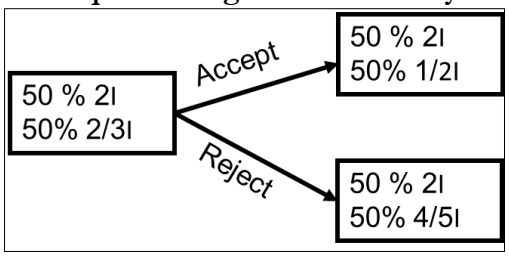
Score	Frequency	Percentage
8	3	1.19
9	7	2.77
10	6	2.37
11	15	5.93
12	16	6.32
13	18	7.11
14	23	9.09
15	27	10.67
16	38	15.02
17	26	10.28
18	21	8.3
19	22	8.7
20	16	6.32
21	7	2.77
22	5	1.98
23	1	0.4
24	2	0.79

[3] Q1 = (25/100) * 28 = 7(th) = 9
Q2 = (50/100) * 28 = 14(th) = 16
Q3 = (75/100) * 28 = 21(th) =23

3.3.1. Gamble score

The gamble score was deduced from the results of the section "Hypothetical Scenario", which was an adjusted rendition of Barsky et al. (1997)'s preference parameters of risk tolerance. The original version measures risk tolerance through the display of serial gambling over lifetime income where the probability of double income and declined income are both 50% regardless of how much the cut is. The gamble commences with a cut of 1/3 and if the participant accepts the offer, the gamble proceeds with half the income. Alternatively, if the first turn was rejected, the gamble would offer a smaller cut of 1/5. Figure 3-1 illustrates the sequence of gambling in Barsky et al., 1997, in which I stands for income.

Figure 3-1. Sequence of gamble in Barsky et al., 1997



Source: Barsky et al., 1997

Notwithstanding the popularity of this survey-based parameter, there have been some remarks about the framing of this study. Specifically, the new job is innately synonymous with a risky job, which might be conducive to status quo bias (Kimball et al., 2009). For that reason, from 1998 onwards, the Health and Retirement Study has utilized a scenario with status-quo-bias-free wording. The supposition then entails health reasons, namely "Your doctor recommends that you move because of allergies, and you have to choose between two possible jobs" (Kimball et al., 2008).

Given the straightforwardness and suitability of Barsky et al., (1997)'s parameters in the survey-based method, this study replicated its logic yet with some adjustments. First of all, the equal possibility of double and declined income sounds unnatural considering the study's focus on career security. Therefore, different chance percentages were assigned to gain and loss. The proportion of income cut was also modified in a way that the following logic of expected utility remains

$$pU(2I) + (1-p)U(\alpha I) \geq U(I)$$

Here p stands for the probability of having double income, 1-p, hence denotes the probability of having the reduced income, and α stands for the remaining proportion of original income. In the study, p is always less than 1-p to elicit a practical contemplation of a job switch. For the details, Table 3.4 lists all the percentages of gains versus losses and the proportions of remaining income in the gamble rounds.

Secondly, because of the adjusted probability, the cut of 1/3 and then 1/2 or 1/5 in the original survey was no longer fitting to the logic. As a result, the study devised new proportions and added one more gamble sequence.

Thirdly, the survey assigned a concrete value of income at 60 million VNĐ (approximately $2455/€2240) since the probability and proportions might appear too complicated as a whole, which could dishearten the response rate. Correspondingly with the mentioned logic, the expected utility of all gamble sequences must be at least 60 million VNĐ. Lastly, the framing for considering a new job is described as "you start to feel bored so you want to seek new challenges", making it an active and stochastic choice instead of the passive health reasons. The wording of the context is as follows:

> Imagine that you are the main income earner in the family, and you have a very good job with a guaranteed income for life. Your monthly wage is 60 million VND. However, you start to feel bored so you want to seek new challenges. Then you come across an opportunity for a new, equally good job. However, the income of this job is not stable.

Then the gamble started with the question, denoting sequence (1):

> Suppose that there is a 45% chance that your income would double (to 120 million VND) and a 55% chance that your income would be cut by 1/3 (to 40 million VND). Would you take the new job?

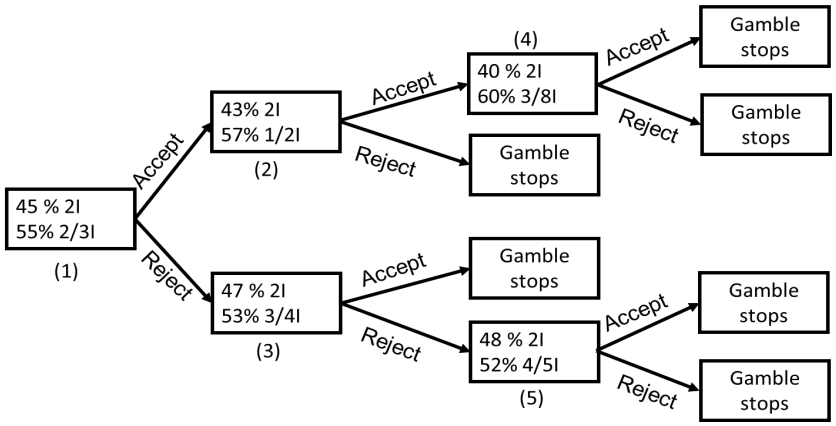
Based on the response yes or no, the second round was divided into two situations, named sequence (2) and (3) respectively. If sequence (2) was accepted, the respondent would be in round 3 with sequence (4). Round 3 would also be proceeded with sequence (5) when the respondent rejects sequence (3). To translate the sequence visually, Figure 3-2 depicts the Loss-Gain Probabilities, Income Remaining Proportions and the sequential logic of the gamble setup.

Table 3.4. Loss-gain probabilities and income remaining proportions of the gamble sequence

	α	p	1-p	Sequence	
Round 1	2/3	45%	55%	(1)	
Round 2	1/2	43%	57%	(2)	If accept (1)
	3/4	47%	53%	(3)	If reject (1)
Round 3	3/8	40%	60%	(4)	If accept (2)
	4/5	48%	52%	(5)	If reject (3)

Source: Own Survey 2023

Figure 3-2. Sequential logic of the gamble setup



Source: Own Survey 2023

Once the gamble is over, the gamble score is deduced from one of the six sequences that the respondents applied for. The gamble score represents the level of risk aversion in each sequence, with 6 being the most risk-averse and 1 being the least risk-averse. The ascending expected utility with the lower score of risk aversion consolidates the notion of certainty effect, indicating that people prefer certain gains rather than the prospect of larger gains with more risk (Kahneman & Tversky, 1979). Table 3.5 exhibits the deduction of gamble scores and their corresponding expected utility and table 3.6 details the frequency of gamble scores among the respondents.

Table 3.5. Gamble response categories

	Downside Risk of Risky Job		
Gamble Score	Accepted	Rejected	Expected utility (million VNĐ)
6	None	1/5	60
5	1/5	1/4	61.5
4	1/4	1/3	68.7
3	1/3	1/2	76
2	1/2	5/8	80.25
1	5/8	None	82.56

Source: Own Survey 2023

Table 3.6. Tabulation of Gamble Score

Score	Frequency	Percentage
1	54	21.34
2	66	26.09
3	68	26.88
4	10	3.95
5	6	2.37
6	49	19.37

Source: Own Survey 2023

From this gamble experiment, the majority of respondents in this sample garner low-risk aversion scores, which is dissimilar to the original findings in Barsky et al., (1997) where most individuals are concentrated in the least risk-tolerant categories (Barsky et al., 1997).

3.3.2. Career characteristic score

The career characteristic score reflects the workplace environment that potentially deters women from childbearing plans or imposes on them the motherhood wage penalty. This index entails four indicators of the work environment: whether the field is male-dominated, whether the employer persists gendered wage gap, whether the job entails appearance/physique requirement, whether the occupation is limited in flexibility, and three self-referent determinants of occupational success, promotion, raise and personal development. The score is created through the yes-no response (yes=1, no=0) to the perception of any existing characteristics out of the seven in their employment.

The first four factors insinuate the employment that will provoke the prominent worries of wage penalty. To begin with, the negative correlations between career interruptions and earnings have been especially well-established

in male-dominated fields (Mincer & Polachek, 1974). The pattern of delayed first birth is also the most salient among women engaging in disciplines with predominantly male workers whereas those in female-dominated disciplines rarely postpone (Mills et al., 2011). The second factor, the gender wage gap, is also linked to the male and female population in employment to a certain extent. For instance, women often concentrate on areas like management, education, and health, while men opt for technical and lucrative fields like IT and science, which further exacerbates the wage disparity between genders (The World Bank, 2021). At the same time, work experience and duration explain roughly 12% of the gender wage gap, rendering obligatory maternity leave of childbearing-induced career interruptions disadvantageous for female workers (Blau & Kahn, 2017). Thirdly, in jobs with physique requirements like athletes, there is a recurrent association between maternity and retirement (Davenport et al., 2022). In athletic careers, planning for pregnancy is taxing since the system does accommodate both simultaneously. The training routine and pressure to be in the best shape also obtrude fertility challenges, whereas getting pregnant hampers their funding and competitiveness (Davenport et al., 2022). And lastly, jobs with little flexibility also known as "greedy work" that calls for inordinate working hours are often the ones with the highest remuneration (Goldin, 2021). Consequently, the wage penalty is formidably expected in occupations teeming with tight schedules, time constraints tasks, interpersonal job responsibilities and engagement in work where colleagues are not easily replaceable (Blau & Kahn, 2017).

The discussed four factors have laid out the workplace contexts that hone their cautiousness toward risky practices, which frustrate childbearing intentions. On top of that, this study proposes that women experiencing career growth will not compromise it considering the anticipated risks of wage penalty. Evaluating and conceptualizing career success is not straightforward. However, for an objective definition, demonstrable achievements such as promotion, wage growth and raises are the most applicable indicators. Besides, promoted occupational status and career satisfaction, captured in personal development, are also sufficient proxies (Heslin, 2005).

3.3.3. Workplace discipline likelihood score (discipline score)

This index portrays the average likelihood of getting any type of disadvantage from the employer due to getting pregnant or having children. In the survey, this score is formulated as a matrix question where the respondents self-rate the likelihood of ten challenges that they might confront because of childbearing. The likelihood is organized as a Likert scale of five levels: 1=Extremely unlikely, 2=Somewhat unlikely, Neither likely nor unlikely, 4=Somewhat likely and 5=Extremely likely.

In detail, the respondent rated the likelihood of experiencing ten obstacles: fine, reduced income, declined income growth, job demotion, job reallocation, promotion opportunity loss, training opportunity loss, physique requirement loss, inability to change jobs, and skill depreciation. The reasons for considering these challenges are as follows:

- Fine: the fine could emerge owing to birth-spacing guideline violation (Ngo, 2020)

- Reduced income: Lower income possibly occurs due to lessened working hours, extra consumption expenses, and restricted job prospects (Bellani & Arpino, 2022)
- Declined salary growth: Wage growth descends potentially due to extended career breaks and clashing family versus labour-market commitment (Wilde et al., 2010; Blau & Kahn, 2017)
- Job demotion, job reallocation: The sense of being substituted or replaced is present in workplaces where job protection is not supportive of motherhood (Myers, 2017) or in manual jobs where vacancies are immediately taken (Adda et al., 2017)
- Promotion opportunity loss, training opportunity loss: Job-related advancement or training opportunities may be sparsely delegated to mothers since other personnel can be more responsive and dedicated to strict deadlines and emergency work crises (Miller, 2009)
- Physique requirement loss: Fertility problems and maternity plans can hamper physical competitiveness (Davenport et al., 2022)
- Job switch inability: Difficulties in changing jobs or transitioning to part-time are frequent among women who have worked for a protracted period with their employers (Wilde et al., 2010).
- Skill depreciation: Skill atrophy is the most pronounced in midcareer cycle, which can be the phase where female employees are most inclined towards having children (Adda et al., 2017)

Afterwards, the index is devised by averaging the Likert-scale scores from ten disciplines. For interpretation, the score dictates the average likelihood of being disadvantaged in the workplace due to childbearing.

3.3.4. Career priority score

This index presents the order of career priority in comparison with other factors. In particular, the survey requested the respondents to rank the order of six variables regarding their life priority: career, finance, physical and mental health, education and intellectual pursuit, romantic relationships, and family and children. Each individual will then obtain a score ranging from 1 to 6, depending on the placement of their career priority, with 6 as deeming career the most fundamental focus in life. For the index of risk aversion regarding career security, only the weight of a career is taken into account at this step. More general outcomes of the ranking will be revealed in Chapter 4 to foreground the common areas of concern amongst Ho Chi Minh City women.

3.3.5. Working status score

The working status score reflects the level of how the labour market affects the woman, ranging from 0 to 2. A woman who is currently in the workforce will thus be the most impacted in the case of job loss so she gets a score of 2. A person who is returning or looking for a job is also sensitive to the labour market. Yet with the present absence of a job, she is temporarily not penalized by the loss of earnings as much, hence a score of 1. And lastly, the working status score of an unemployed and not job-searching person is 0.

3.3.6. Career versus marriage score & career versus children score

The career versus marriage score and career versus children score display the relative involvement of career in the process of marriage and fertility decision. The former possesses a value of 0 to 2 and the latter gets a binary value of 0 or 1. The career versus marriage score is appraised by asking a series of questions about marriage intention. Firstly, the respondent is asked whether they are married or aspire to get married. If the question was yes, the survey proceeded with inquiring about the necessary conditions. If a career was counted as one of the necessities, respondents are assigned a score of 1, and 0 otherwise. Conversely, if there was no plan to get married, the survey resumed with questioning the reasoning why. If the corresponding answer was because of career concerns, the score will be 2. Let W(X) denote the weight of variable X. Table 3.7 explains the score assignment with each relationship between the personal weighting of career and marriage.

Table 3.7. Career versus marriage score logic

Score	Logic
0	W(career) ⫫ W(marriage)
1	W(career) ⇔ W(marriage)
2	W(career) > W(marriage)

Along the same lines, the career versus children score denotes the weighting between career and children. Yet, there is no proof that the decisions for getting married and having children are orthogonal so the necessary conditions for getting married might influence childbearing plan realization. As a result, the study ascribes the scores solely based on the interaction between career prioritization and the decision to have children, additional children or no child at all. Similarly to the "career versus marriage" score, 0 is assigned when the child-having aspiration is independent of career ambition. For women who have already become mothers but decide to not have more children because of career concerns, they will get a score of 1 and finally, 2 is attributed to the respondent focusing on career to the point of not wanting children at all. Table 3.8 illustrates the score and logic of this index.

Table 3.8. Career versus children score logic

Score	Logic
0	W(career) ⫫ W(children)
1	W(career) > W(children) when N(children)>0
2	W(career) > W(children) when N(children)=0

3.4. Data analysis

The research purpose of this study is to examine the hypothesis that risk aversion regarding career security will increase the WTA SEF. To provide meaningful interpretations, the study investigates the attitude towards SEF under three nuances: the perception that it is a viable family planning option, the likelihood to opt for it and the propensity to use the treatment in case of natural pregnancy is impossible.

For the first one, the response was binarily formulated as yes or no. Therefore, the identification strategy involves running a nomial logistic regression to control for demographic background human capital fixed effect and personal childbearing intentions. Regarding the perception of whether SEF is a viable family planning option to hedge against unsuccessful natural conception, the assumption is that it is a personal standpoint. So, the model will not control for the unobserved heterogenous parents' or partner's interference. Following the aforementioned hypothesis, the logistic regression is modelled as follows

$$\begin{aligned}\text{logit}(\text{P}(\text{Viable} = 1) &= \beta_0 + \beta_1 Risk\ Aversion\ Score + \beta_2 Demographics \\ &+ \beta_3 Human\ Capital + \beta_4 Job + \beta_5 Expectations \\ &+ \beta_6 Fertility\ Problem + \epsilon\end{aligned}$$

Where P(Viable=1) is the probability of the dependent variable "Viable" taking the value 1. In other words, it indicates that the respondent perceives SEF as a viable family planning option given individual Risk Aversion Score and vector variables "Demographics", "Human Capital" and "Expectations". β_0 is the intercept and $\beta_1, \beta_2, \ldots, \beta_6$ are the coefficients associated with the independent variables, which are estimated through maximum likelihood estimation.

All the independent variables in this model represent a vector. To be specific, "Demographics" include a set of multiple variables, which are age, marital status, sexual orientation, ethnicity, religion, urban district*, number of children, number of siblings and household status. Likewise, "Human capital" entails completed educational level, years of schooling, years of working and the plan to follow higher educational pursuit*. "Job" consists of the job's sector, time basis, and educational requirements. "Expectations" comprise the number of desired children, child gender preference, whether marriage is needed to have children*, being a single mom*, having the intention to become a single mom*, and family priority. "Fertility Problem" denotes the confirmation of having* or not having* fertility-related problems[4] and lastly, "Sexual Behaviors" contains whether a person has been engaged in sexual activity* or contraception usage*.

As for the latter two dependent variables, the responses contain five levels of likelihood and ordered logistic regressions were performed to deduce the analysis. In Vietnam, fertility decisions are often influenced by the family and relatives (Wiersema et al., 2006) Therefore, the regression also controls for partner-related variables, such as the presence of a partner, the sexually active status and the pertinent usage of contraception, and the parent's education levels in the models of "WTA SEF". Since there are five likelihoods in the response the likelihood "extremely likely" (level 5) will then be the reference category. The equation for the cumulative odds for each level j (where j ranges from 1 to 4) can be expressed as follows:

[4] (*) signifies binary variable (0=no, 1=yes)

$$\text{logit}(P(WTA \leq j) = \alpha_j - \gamma_1 Risk\ Aversion\ Score - \gamma_2 Demographics - \gamma_3 Human\ Capital - \gamma_4 Job - \gamma_5 Expectations - \gamma_6 Fertility\ Problem - \gamma_7 Partner - \gamma_8 Parents'Education - \gamma_9 Sexual\ Behaviors + \epsilon$$

Here logit(P(WTA ≤ j) is log-odds that the dependent variable WTA is less than or equal to the level 5 "extremely likely"; α_j is the intercept for each separate level j and $\gamma_1, \gamma_2, \ldots, \gamma_8$ are the coefficients associated with the independent variables respectively.

The equation for the nuance "Likelihood to opt for treatment in case of natural conception inability", denoting as "WTA_Problem" is constructed likewise. But with this dependent variable, the model will not control fertility problems, the current number of children and the sexual behaviours vector.

Chapter 4 Survey Results

4.1. Descriptive statistics

The data consists of 253 respondents based on their valid responses and response rate of at least 92%. Tables 4.1 and 4.2 summarize the descriptive statistics of categorical variables under demographics and human capital vectors. Followingly, Table 4.3 presents the summary statistics of the continuous variables of these two vectors.

All ages are represented in the sample, in which the mean age is 26.3 and the median age is 24. As reported in the Vietnam Population and Housing Census 2019 (GSO of Vietnam, 2019), the age group with the highest population in Ho Chi Minh City is 25-29(GSO of Vietnam, 2019), indicating that the sample is consistent with the city's age structure. Regarding further demographic details, 197(77.87%) women are single, 52(20.55%) are married and 4(1.58%) are divorced. Women participating in this survey are mostly without children at the moment as only 41(16.21%) reported having at least one child and out of them, 30 said that they had one child.

Regarding the residential distribution, 241 (95.21%) reside in urban areas (Quận) and 12 (4,79%) live in suburban areas (Huyện). The sample size covers the residents of all districts, except for Cần Giờ. This exclusion is presumably attributed to its least population, remote location (50km from the city centre), and the fact that it is fluvially separated from downtown Ho Chi Minh City. Back in 2019, the city consisted of 19 quarters (urban districts) and 5 districts (suburban districts), namely Bình Chánh, Cần Giờ, Củ Chi, Hóc Môn and Nhà Bè. In 2021, Thủ Đức City (a concept of "City within the city") was established by merging 3 urban districts: 2, 9 and Thủ Đức. However, all respondents still specified District 2, District 9 and District Thủ Đức in their responses and the urban and sub-urban differentiation still holds under The new municipal arrangement nevertheless. Furthermore, according to the Census in 2019, the urban population in Vietnam was 3,676,784, comprising 79.23% of the total population so this sample is somewhat more characterized by the urban residents compared to the total population. In this light, this study will enrich the progressive discourse on incorporating reproductive options into family planning strategies under the focal point of women in urban settings like Ho Chi Minh City.

The ethnicities of the respondents correspond to the two most populated ones of the city, with 242 (95.65%) Kinh people and 11(4.35%) Hoa people. The majority of survey participants do not follow any religion (167), followed by Buddhists (60) and Catholics (20), cumulatively accounting for 97.63%. In terms of sexual orientation, 220 (86.96%) respondents identified as heterosexual, 7 (2.77%) as lesbian, 25 (9.88%) as bisexual or pansexual and only one identified as asexual. Lastly, when asked to self-rate the current household status out of five levels, 112 chose "average" (44.27%), 96 and 42 respectively said it was above average and well-off, whereas only 3 chose "under average" and thus zero reported having a poor household situation.

Concerning the human capital level, the majority of the women are highly educated, 81.03% have completed university and post-graduate degrees, yet 84.98% have attended 16 and above years of schooling. The point of 16 years is examined since the Vietnamese formal education comprises three levels: primary school, secondary school, and high school, which spans 12 and university normally lasts at least 4 years (GSO OF VIETNAM, 2019, accessed on 12th January 2024). 234 women had been involved at some point in the labour market, in which 65.61% of jobs require a bachelor's degree and on average, the respondents have gathered 4.38 years of working experience.

Table 4.1. Descriptive statistics of Demographics

Demographics			
Variable		N	%
Marital Status			
	Single	197	77.87
	Married	52	20.55
	Divorced	4	1.58
Number of Children			
	0	212	83.79
	1	30	11.86
	2	10	3.95
	3	1	0.4
District			
	Urban	241	95.26
	Sub-urban	12	4.74
District Name			
	1	5	1.98
	2	12	4.74
	3	8	3.16
	4	7	2.77
	5	7	2.77
	6	7	2.77
	7	13	5.14
	8	10	3.95
	9	3	1.19
	10	20	7.91
	11	12	4.74
	12	5	1.98
	Bình Tân	10	3.95
	Bình Thạnh	24	9.49
	Gò Vấp	19	7.51
	Phú Nhuận	13	5.14
	Tân Bình	32	12.65
	Tân Phú	17	6.72
	Thủ Đức	17	6.72
	Bình Chánh	5	1.98
	Củ Chi	2	0.79
	Hóc Môn	3	1.19
	Nhà Bè	2	0.79
Ethnicity			
	Kinh (Vietnamese)	242	95.65
	Hoa (Chinese)	11	4.35
Religion			
	None	167	66.01
	Buddhism	60	23.72
	Catholicism	20	7.91
	Others	6	2.38
Sexual orientation			
	Straight	220	86.96
	Lesbian	7	2.77
	Bi/pansexual	25	9.88
	Asexual	1	0.4
Household Status			
	Under average	3	1.19
	Average	112	44.27
	Above average	96	37.94
	Well-off	42	16.6

Table 4.2. Descriptive statistics of Human Capital

Human Capital		
Variable	N	%
Working status		
Unemployed	15	5.93
Studying	54	21.34
Working	184	72.73
Paid job ever		
No	19	7.51
Yes	234	92.49
Educational level		
Secondary school	2	0.79
High school	24	9.49
Intermediate/Vocational school	6	2.37
College[5]	16	6.32
University	174	68.77
Master's degree	30	11.86
Doctoral Degree	1	0.4
Sector		
Public	51	21.79
Private	99	42.31
Multi/international	57	24.36
Self-employed/informal	19	8.12
Others[6]	8	3.42
Employment type		
Fulltime	188	80.34
Parttime	31	13.25
Freelance	15	6.41
Job's educational requirement		
No requirement	15	5.93
High school	14	5.53
Intermediate/Vocational school	12	4.74
College	20	7.91
University	166	65.61
Masters degree	25	9.88
Doctoral Degree	1	0.4

Table 4.3. Summary statistics of continuous variables in Demographics and Human Capital

				Quantiles				
Variable	**n**	**Mean**	**S.D.**	**Min**	**0.25**	**Mdn**	**0.75**	**Max**
Age	253	26.3	4.43	22	23	24	30	38
Years of schooling	253	16.82	2.38	9	16	16	17	28
Years of working experience	253	4.38	4.06	0	1	3	7	20
Number of children	253	0.21	0.52	0	0	0	0	3
Number of siblings	253	1.4	1.02	0	1	1	2	6
Number of mom's siblings	242	4.84	2.64	0	3	5	6	14
Number of dad's siblings	236	4.92	2.72	0	3	5	7	13

[5] College is a also a type of tertiary education but with lower level than University and is usually carried out for 2 to 3 years (Decision 25/2006/QĐ-BGDĐT, Ministry of Education, 2006)

[6] "Others" broadly include three types: social enterprise, education sector and non-profit. The respondents were asked to type the specific sector of their employer when choosing this option.

4.2. Resonations of family planning policies

4.2.1. Current norms on family size

The results underscore the considerable impacts of family planning policies on the current perceived norms of family scale. To commence with, it should be noticed that the observations for parents-related variables in the following parts are invariably below the sample size, implying either the respondent's lack of knowledge about their parents or a certain degree of estrangement. Nevertheless, the findings still uphold the relevancy of family situations and family planning programs. First of all, as shown in Table 4.4, both mean and median number of parents' siblings converged towards number 5, indicating a family size of 6 children while the mode was 5 among the mothers and 4 among the fathers. Therefore, before the late 1980s, the paradigmatic family size comprised 5 to 6 children. Back in the day being an only child was infrequent as only 2.07% of mothers and 0.85% of fathers fell within this category. In parallel, around 90% of both mothers and fathers have from 1 to 8 siblings and the recorded maximum stood at 14.

In contrast, when checking the respondents, almost 60% reported having only one sibling. On average, each person has 1.4 siblings, thereby signifying a realized household size of two to three children. The occasions of an only child ascended to be third most common and couples were disposed to put a limit at four children as a mere 4.74% of respondents had at least four siblings. Due to the age restriction criteria, the respondents' birth years fall within the range of 1985 to 2001, a period during which family planning policies already came partially or fully into force in the South. Manifestly, drastic transformations in family size have ensued after the introduction of these policies.

Thereafter, the study prompted participants to share both their perceived average number of children per couple and their desired number of children. Notably, 212 respondents assertively selected two as the prevailing number of children in a household. In addition, three implied choosing "one to two" while one suggested "two to three", culminating in two children as the benchmark for 85% of the respondents. In this aspect, compared to the entrenched standard of "two to three children" within the last forty years, the perception in the present day has fixated on the ideal quantity of exactly two. Notably, there existed more discernible variations in the aspired number of children. Although two remain the ideal, as indicated by 53.36% of respondents, it is noteworthy that being child-free emerges as the subsequent preference, chosen by 23.72%. Within the subset of individuals expressing a desire for parenthood, 98% set the limit from one to three.

Two indices can be derived from the obtained results: the desired fertility rate and the perceived fertility rate. Firstly, the perceived fertility rate at 1.95 (SD= ±0.38) is akin to the current total fertility rates of Vietnam at 1.96 and still aligns closely with replacement fertility rates. Moreover, it represents the ingrained societal expectation regarding the ideal number of children fostered by family planning policies. On the other hand, the desired fertility rate within this sample stands at 1.53 births per woman (SD= ±0.38). This figure is significantly lower than the target of 2.1, yet already surpasses the actual rate of 1.39

in Ho Chi Minh City. The discrepancies here showcase noticeable disparities in realizing the fertility desires in reality, and the goal to bridge Ho Chi Minh City's fertility rate to the total replacement fertility rates will especially forsee formidable pitfalls. In summary, family planning policies have influenced the deeply embedded norm of 2 children on average per household. This notion along with contemporary living situations renders the endeavor of meeting the benchmark at 2.1 highly unfeasible.

Table 4.4. Descriptive and summary statistics of perceived average number of children and number of desired children

Perceived average number of children	n	Mean	Min	0.25	Mdn	0.75	Max
	252	1.95	1	2	2	2	3
Quantity	**N**	**%**					
1	24	9.52					
1.5[7]	3	1.19					
2	212	84.13					
2.5[8]	1	0.4					
3	12	4.76					
Number of desired children	**n**	**Mean**	**Min**	**0.25**	**Mdn**	**0.75**	**Max**
	253	1.53	0	1	2	2	5
Quantity	**N**	**%**					
0	59	23.32					
1	31	12.25					
2	135	53.36					
3	25	9.88					
4	2	0.79					
5	1	0.4					

4.2.2. Beliefs about other family planning guidelines

The results also disclosed the modern viewpoints about intervals between births, gender preferences and contraception usage as these aspects have been meticulously addressed since the initiation of the family planning program in 1988. Concerning birth spacing, 250 respondents provided their own opinions and 188 reported the gaps between first births and last births of their mothers. In the case of the mothers, the mean year gap was 5 years (SD = ±3.23) and more than half experienced birth spacing of four years or fewer. The minimum birth spacing recorded is 0, which implies instances of either multiple pregnancies or immediately successive births within a year. Conversely, the most extended gap observed is 16 years, with the mom's first birth occurring at 23 years and the last birth at 39. These empirical findings about the mothers' birth history insinuate that there is a certain degree of variability in complying with the family planning policies concerning spacing guidelines between three to five years.

[7] 1.5 stands for 1 to 2 children.
[8] 2.5 stands for 2 to 3 children.

Despite the various degrees of compliance in terms of birth spacing, the efficacy of family planning programs in reducing gender preferences is still respected. In this context, 83% of the sample (210 women), claimed no preference for the sex of children. Interestingly, a greater number of respondents asserted a penchant for daughters, with 28 favouring daughters compared to 15 favouring sons. Conventionally, in East, South and Southeast Asian countries, the cultural norms still perpetuate son preference because sons are entitled to provide support to their parents in their elder years (Ngo, 2020). With the disappearing gender preference, selective abortion instances will gradually be diminished and the trend of women continuing to give birth until they bear a son will decrease in frequency.

Likewise, the influence of family planning programs on the provision of contraceptives still resonates with nowadays birth control behaviours. Free access to birth control devices and abortion services funded by the state are unarguably the most noteworthy and evolutionary initiatives (Council of Ministers, 1989). From the sample, 63.24% are sexually active and among this subgroup, a striking proportion of 90.63% have utilised at least one method of contraception and an average respondent uses 1.8 types of contraception at the same time. Figure 4-1 demonstrates the number of users per contraception method. Notably, the survey also listed the options of withdrawal and period tracking, which are behavioural or natural methods of contraception and are frequently criticised for their unreliability (Jain & Muralidhar, 2011). Accordingly, a significant portion of respondents using pulling-out (84.85%) and calendar method (89.47%) do not rely solely on them. Table 4.5 breaks down the alternative methods that are used in combination. Amongst the alternatives, condoms were most consistently integrated into the birth control routine. Contraceptive pills, interestingly, were incorporated more often by respondent using the withdrawal method than period cycle tracking, which could be attributed to the concerns about their hormonal mechanism. Nevertheless, contraceptive pills and especially condoms are the most dominant methods amongst the general sample population that are sexually active. The high rate of contraception usage translates into the low frequency of ever having unwanted pregnancies. Precisely, eight (3.16%) respondents jointly had experienced such incidents, in which only one had incurred more than one time. Again, the answers consolidated the efficacy of family planning propaganda regarding birth control behaviours and the heightened awareness and utilisation of contraception, leading to a reduction in the incidence of unwanted pregnancies among young women.

Figure 4-1. Contraception methods and frequency of users per category (n=160)

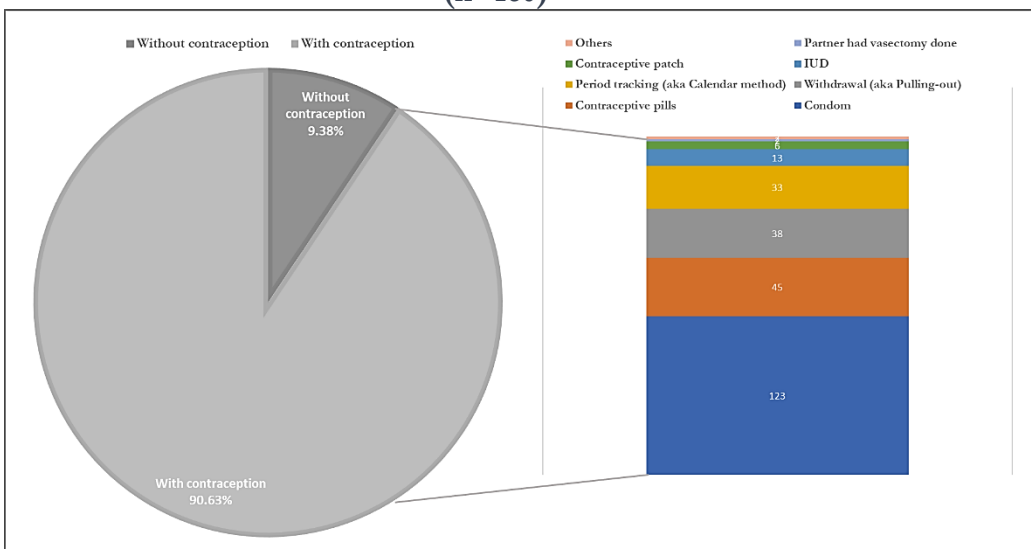


Table 4.5. Combination alternatives of respondents using period tracking and withdrawal methods

Period Tracking (n=33)			Withdrawal (n=38)		
Combination Alternatives	**N**	**%**	**Combination Alternatives**	**N**	**%**
None	5	15.15%	None	4	10.26%
Contraceptive pills	10	30.30%	Period calculation[9]	14	2.56%
Withdrawal	14	42.42%	Contraceptive pills	17	43.59%
Condom	26	78.79%	Condom	32	82.05%
IUD	3	9.09%	IUD	3	7.69%
Contraceptive patch	2	6.06%	Contraceptive patch	2	5.13%
Partner had a vasectomy done	1	3.03%	Partner had a vasectomy done	1	2.56%

4.3. Perceptions about marriage and childbirth

4.3.1. Personal intention and potential influence of mothers

The survey unveiled the expectations of the respondents about the marriage and childbearing timing and examined if the planned or perceived timing was benchmarked by the mothers. Table 4.6 below summarizes the different records of actual as well as planned and perceived marriage and childbearing timing of the respondents and their mothers.

The results show that on average mothers were wedded by 25, between the range of 25 and 30, from 50% to 93.6% of them had already gotten into matrimony. Notably, 35 was exactly the latest age for marriage among mothers, as observed in three individuals and there were two occasions of underage (below 18) marriage and birth. For other mothers, it often took them within 1.5 years post-marriage to welcome the first child and almost 80% of first births

[9] Only one respondent combines solely withdrawal and period calculation together.

occurred by the time the mother turned 30. In the event of final childbirth, most experienced it in their early thirties, at an average of nearly 33. Surprisingly, the findings reveal an unexpected pattern, with approximately 30% of last births taking place after the age of 35. Nevertheless, a mere 3% of childbirths were given by mothers in their forties.

Table 4.6. Summary statistics of mothers and respondents' actual, planned and perceived marriage and births timings

				Quantiles				
Variable	**n**	**Mean**	**S.D.**	**Min**	**0.25**	**Mdn**	**0.75**	**Max**
Mother's age at marriage	203	24.89	3.68	16	22	25	28	35
Mother's age at first birth	219	26.23	4.11	16	23	26	29	39
Mother's age at last birth	199	32.9	4.42	19	30	33	36	43
Married respondent's age at marriage	56	26.52	2.98	20	24	27	29	32
Planned age at marriage	163	29.88	3.33	24	28	30	31	45
(Planned) Age at first birth	176	30.45	4.02	2	29	30	32	43
(Planned) Age at last birth	154	34.55	3.04	28	32	35	36	43
Perceived average age at marriage	252	27.77	2.38	22	26	28	30	35
Age at marriage is considered late	248	39.14	7.2	30	35	40	40	80
Perceived average age at first birth	251	27.47	2.45	18	25	28	29	35
Perceived average age at last birth	251	36.71	4.42	24	35	35	40	50

Normatively perceived timing

Subsequently, all women went through a series of questions about their timing perceptions, commencing with the typical age at first marriage. The three numbers that surfaced were accurately 27, 28 and 30, specifically 28 and 30 accounting for roughly 20% and 25% of the responses respectively. Besides, 22 and 35 marked the opening and closing thresholds, coinciding with the certain ages specified in the fertility policy. Overall, the outcomes denote implicit impressions that marriage normally begins at the typical age of graduating from higher education, takes place most frequently by the woman's 30th birthday and no later than 35. It can be deduced herewith that 35 and above represent a relatively "late" age at marriage.

Following that, the survey posed an explicit query exploring what is considered a "late" age at marriage. As anticipated, the results missed five responses and concurrently encountered a high degree of variability as many respondents insinuated that no age should be associated with belated matrimony. Therefore, the analysis centres on the ages with the highest frequency of age and age range since they reflect the immediate apprehension of the general population on this subject. Remarkably, 35 and 40 received the most mentions under this perspective, arising 74(29.83%) and 78(31.45%) times. Following closely were 30, 45, and 50, each constituting less than 10%. Of significance, 30 represents the earliest age recorded within this context. In terms of age ranges, 35-40 continued to dominate by a landslide as arose in almost 2/3 of the total responses. 30-35 and 40-45 received relatively similar picks, registering around 44% and 40% of occurrences respectively.

Despite diverse personal childbearing and childrearing intentions, all respondents were subjected to share their observations regarding the average age at first and last birth. Specifically, survey participants most frequently witness initial pregnancies among 28-year-old women. In a broader sense, the event of becoming a mother expanded noticeably amongst women in the mid-twenties leading to 30. At the same time, respondents proposed that a prevalent decision among women is to have their final child at the age of 35. The timeline for the last pregnancy was predominantly realized amongst women ranging between the mid-30s to approaching 40.

Past and Personally Planned Timing

Afterwards, more detailed questions about personal timing plans were directed to the survey participants depending on each context. To be specific, 56 married and divorced respondents were enquired about their age at marriage while 163 single women with marriage intention answered questions about their plans. On average, respondents got married for the first time at around 26.5 years, remarkably mirroring the statistics for women in urban areas (at 26.4) and the Southeastern region (26.5) in 2019 (GSO OF VIETNAM, 2019). In contrast, the anticipated age at marriage among respondents who had never been married was nearly three and a half years older and more than half expected to get married within five years. Among the singles, 30 emerges as the most commonly selected point for contemplating marriage. In general, the majority envisioned being married somewhere between their late twenties and early thirties, specifically with the range 28-31 centring preferred window.

Following this, responses about the planned age of first birth were solicited among surveyees expressing childbearing desires and women wanting multiple children simultaneously provided their projected age of the last childbirth. The responses for the anticipated first-birth timing revealed that, similarly to the envisioned age at marriage, there is a convergence at the age of 30. Half of the respondents proposed that embarking on motherhood should ideally fluctuate between 28-29 to 32 years of age. As for women desiring multiple children, 35 is most assertively set as the age for the last birth. Even among those with more than one child's aspirations, pregnancies were not favoured to occur in the late thirties. Instead, most outlined the age range of 32 to 36 for the final pregnancy plan. Consequently, amongst unmarried individuals, the results unfolded a salient trend of gravitating pivotal life events toward the benchmarks of 30 or 35.

One might presume that the personal plans about marriage and fertility of a woman must be linked to her upbringing and surroundings. In this scenario, it could be conjectured that an individual's anticipated age at marriage must pertain to when her mother got married and her fixation on the average age in such events. To investigate if there exist any listed correlations, the study did some back-of-the-envelope calculations. However, there was no significant relationship between the mother's age and the respondent's intended age at marriage, nor was any correlation detected with the respondent's perceived average or seemingly delayed age. Along the same lines, the mother's age at motherhood exerted no statistically significant links to the respondent's realized or planned age of first childbirth. Likewise, among the married respond-

ents, no discernible relationship was identified between their mothers and their own age at marriage. On top of that, within this sub-group, the perceived and opined late age does not statistically establish any connection with their past timing of getting married.

In contrast, amongst the single respondents, preliminary tests unveil that personal perceptions of typical and delayed age of marriage positively correlate with individually planned age at marriage. Correspondingly, it can be inferred that there is a tendency for individuals who perceive a higher mean age at marriage or deem an older age as delayed to also envision marriage at a later age or vice versa. In parallel, a positive association was found between anticipated first birth timing with the perceived average age of first birth. It should be noted that correlation is not synonymous with causation, and thus definitive conclusions about the directions of these relationships were not drawn. However, a temporary implication is that a person's planned age at marriage aligns more closely with her independent perspective than her mother's history. Conversely, concerning the personally planned, the mothers' and the commonly observed age of last birth, they all positively correlate with each other. The interconnections potentially suggest the presence of exogenous factors influencing the general timing of later pregnancies.

4.3.2. Marriage and Childbearing Expectations

Anti-marriage reasons

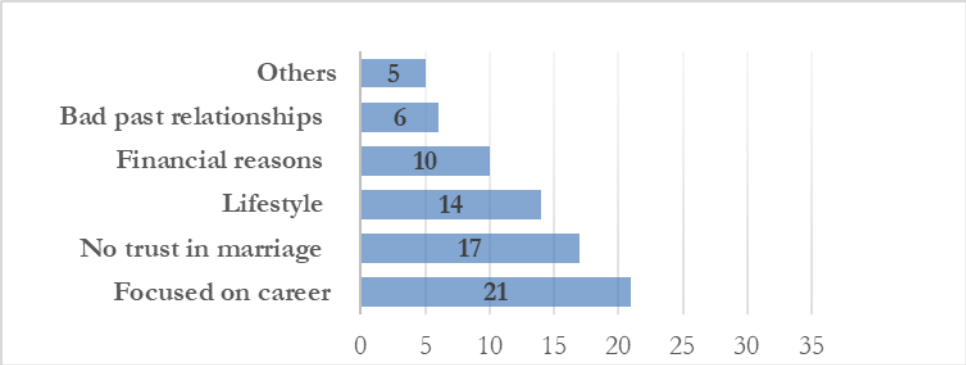
The explorative dimensions about the prospects of getting married (again) and childbearing desires amongst single and divorced women also surfaced in the survey. In the case of women who are already mothers, the question was rephrased to inquire about their intentions regarding having additional children. Besides, all respondents disclose the necessary conditions that must be achieved before contemplating marriage.

To be specific, there are 197 respondents presently not in a marital union. Out of this group, 34, inclusive of 3 divorcees, have articulated disinterest in marriage, or remarriage. Primarily, the indifference towards marital institutions is most pronouncedly underscored by a focus on career pursuit, as affirmed by more than half of the cohort. In comparison with the general population, this career-driven subgroup represents 8.3% of the respondents. Moreover, given their utmost priority of career over marriage, they garnered a score of 2 for their respective "career versus marriage" index, as explained in Chapter 3.

It is noteworthy that all three divorcees explicitly selected this motive as the rationale for not remarrying and more importantly, each of them singularly chose this as the exclusive reason. Therefore, alternative driving forces for the absence of marital intent were appraised strictly from the standpoints of the single respondents. In tandem with career ambitions, a sense of distrust towards marriage also dissuades a comparable number of respondents. As a result, half of the singles in this cohort cited career advancement and scepticism as the overriding distractions from marital commitment. Following that, lifestyle and financial worries were often regarded as the grounds for not seeking a spouse. In addition to the preformulated reasons, four respondents contributed personal narratives explaining the disengagement from marriage intention.

For instance, two homosexual respondents do not aspire to marry mainly due to the non-recognition of same-sex marriage in Vietnam. Among the other two participants, one assertively expressed an aversion for marital bindings whereas one exhibited a lack of foreseeability for marriage intention since she is currently not in a courtship.

Figure 4-2. Reasons for not pursuing marriages (n=37)



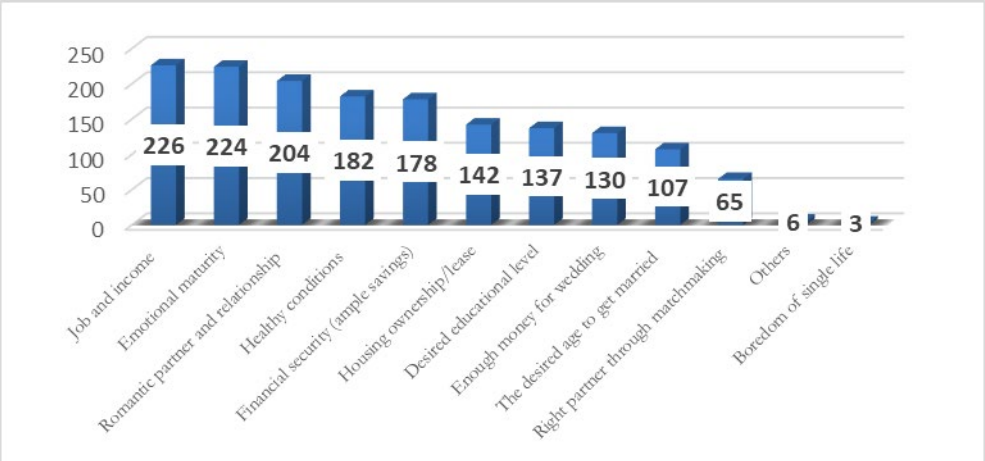
Conditions to get married

Notwithstanding varying perspectives on marriage, all the survey participants were queried to opine on the necessities or the essential requirements to readily enter marriage. Collectively, eight conditions received selections from over 50% of the entire respondent cohort. To commence the discussion, an overwhelming majority of survey participants highlighted the paramount importance of a secure professional trajectory and satisfactory income. Precisely, 226 respondents, comprising 89.33% of the sample, unequivocally affirmed this condition, positioning it as the most crucial prerequisite. Amongst the women who want to get married in the future, this selection implies that they place a comparable weight between career and marriage priority, thus their "career versus marriage" score is 1. Almost an equivalent number of respondents emphasized the imperative need for emotional maturity before embarking on marriage. In close succession, the important presence of a loving partner and an adequate long-term relationship was acknowledged by 80.63% of the total respondents. In essence, these three criteria epitomize the quintessential requirements in terms of resources, romantic security and psychological self-preparedness in correspondence with the milestone of marriage.

The following five conditions also received mentions from more than 50% of the respondents, namely meeting health conditions, having ample financial savings, either owning or leasing own residence, having accomplished the targeted educational level, and having sufficient finances for the wedding celebration. On the contrary, reaching the desired age is not necessarily a marriage precondition among the majority. Moreover, within this context of urban residents, matchmaking was not a preferred approach, and very few proposed that the ennui of a single life might prompt them to enter into marriage. As for other conditions, they still revolve around the listed conditions, yet incorporate additional details and personal remarks. For instance, respondents emphasise that there is no concept of a "long enough" relationship but instead, it must be that both parties feel ready and have common future personal development

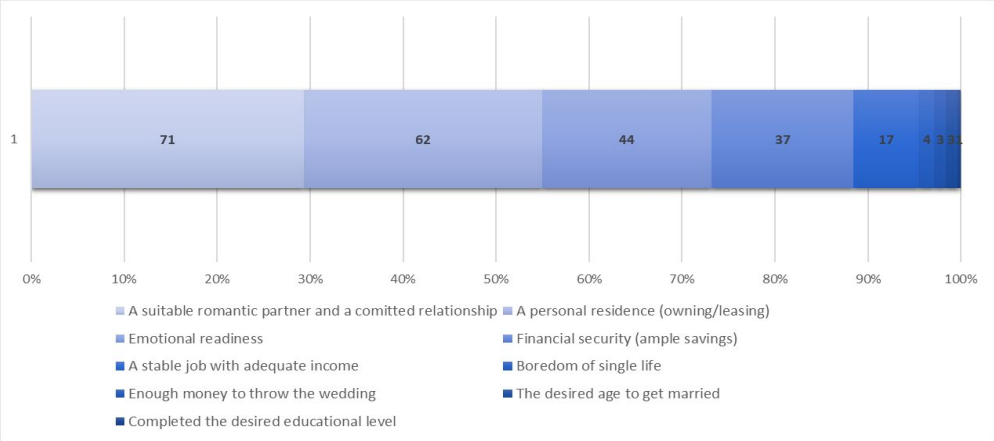
goals and the partner should have certain qualities such as respectfulness, reliability and suitability. Two more discussed the financial stability and confidence to manage potential expenses arising from the marriage in the future that derive from, for instance, having children.

Figure 4-3. Ranking of conditions for marriage (n=253)



Moreover, participants were tasked with providing detailed insights into the life conditions that they believed as most difficult to achieve. As for a stable career, despite being the most necessary condition, only 17 respondents cast doubts on its achievability. Conversely, the quest for a suitable partner and a committed relationship is characterized by the most imminent pitfalls, as suggested by 71 respondents. Independent housing, while not initially seen as a top necessity, was identified as the second factor that would require concerted efforts to achieve. And lastly, emotional readiness was emphasized as complicated by 44 respondents. These findings shed light on the nuanced considerations individuals prioritize when assessing the difficulty of meeting certain life conditions. Through this comprehensive examination, it is discernible that love and self-assurance manifest as indispensable and complex aspects of marriage contemplation. While a career can function as a springboard for it, optimistically speaking, its attainment is not steadfastly arduous. In contrast, property ownership, albeit recognized as an evident obstacle, may not necessarily represent an immediate prerequisite for both partners to accompany each other into matrimony.

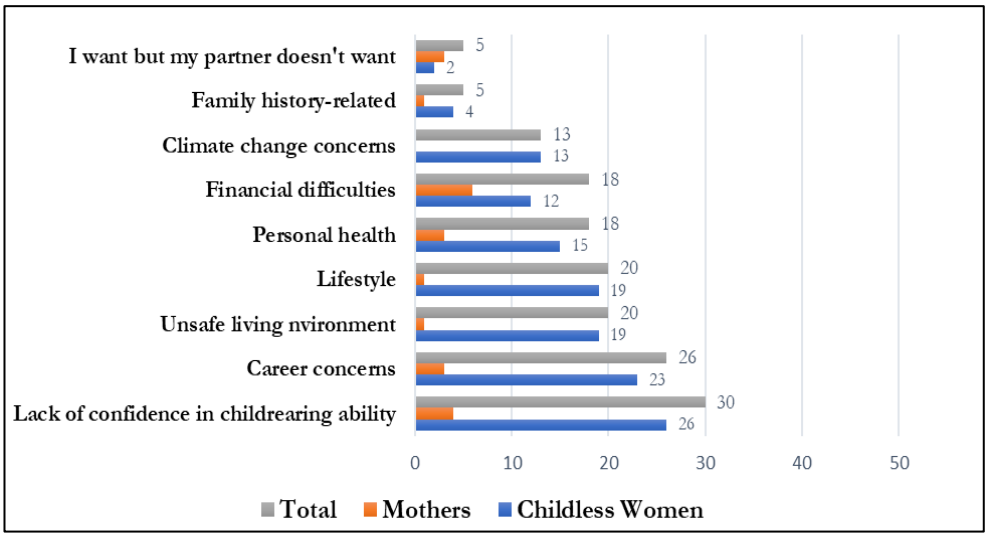
Figure 4-4. Compositions of the most difficult-to-achieve condition



Child-free motivations

After marriage queries, respondents were tasked with inquiries about their childbearing intentions. As previously noted, 59 respondents explicitly voiced a choice to remain childless throughout their lives Besides, 17 mothers do not project plans to pursue further pregnancies. Given their different motherhood status quo, the full picture of them saying no to future childbearing plans should be analysed from separate angles.

Figure 4-5. Distribution of reasons for not wanting (additional) children (n=59)



Among mothers, 14 out of 17 directly stated that they are already content with the current number of children. However, not all of them inherently hold this view as three respondents added that they intrinsically want more but the decision is compromised with the partners' liking. Beyond individual preferences, the most prevalent consideration for halting childbearing plans encompasses financial struggles as raising multiple children generates a multitude of

living expenses that potentially burden the couples. Concurrently, a quarter of this cohort admitted the lack of confidence in terms of childraising capacity. Within this group, there persists a sense of perpetuation about not aptly delivering the best upbringing and education environment for their children. Furthermore, among mothers, the cautions about job hindrances and impacted health conditions are also occasionally validated as the grounds for not expanding their families. If career concerns were cited as the reason for not planning on additional children within this group, their "career versus children" score would accordingly be 1.

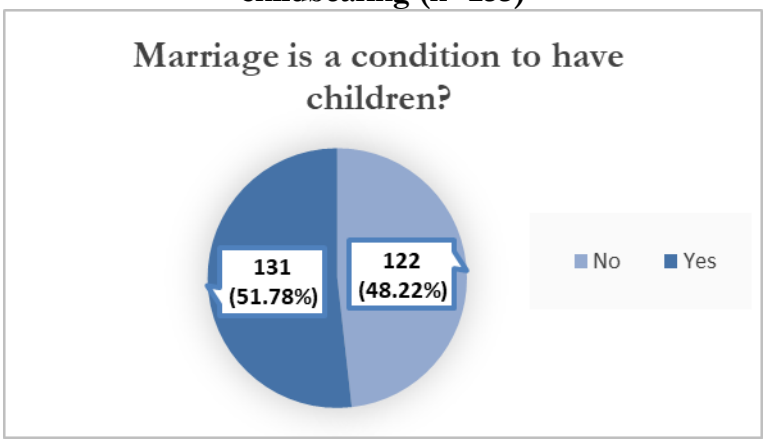
On the same page, there is an overarching uncertainty regarding the capability to nurture children among childless women who deliberate to maintain this status permanently. The doubt about not guaranteeing the best childrearing facilities abstains almost half of this subset from motherhood. In addition, patterns of career-driven childlessness followed closely and are the second most noticeable, accounting for 40% of the cases. In the scope of this study, women who resolutely prioritize careers and thus definitively opt for voluntary childless will get a "career versus children" score of 2. Primarily, voluntary childlessness is also dictated in conjunction with the women's acknowledgement of their own lifestyle and the cognition of existing social insecurities in the living environment, e.g. child abuse. Notably, compared to mothers, very few women not yet with children deduce their fertility desires contingent upon the opinions of their partners.

To summarize, amongst mothers, concerns about tangible issues such as financial difficulties override their decision to halt childbearing plans. Nevertheless, the perceived worry about lacking childrearing and education capabilities affects both mothers and childless women substantially, culminating in the decision to have no (additional) children. For single women, voluntary childlessness is also driven prevalently by life orientations and career ambitions.

Single motherhood perspectives

Thus far, the survey has uncovered the essential conditions for marriage and the motivations behind the decision to forgo marriage and motherhood. However, the connection between marriage and childbearing remains a key question, or straightly put, if marriage is viewed as a prerequisite for having children. Within the surveyed sample, opinions are nearly evenly divided on this matter. The data reveals a slight majority in favour of the affirmative, with 51.78% endorsing the notion that marriage is a necessary condition, as opposed to 48.22% that hold the contrary view.

Figure 4-6. Responses to whether marriage is a necessary condition for childbearing (n=253)



Proceeding with this marriage-childbearing causality dilemma, the survey delved deeper into the concept of single motherhood. Among the 253 respondents, 29 claimed the vision of potentially embracing single motherhood in the future while 7 are presently in that role. Significantly, the majority (24 out of 29 and 4 out of 7) consistently did not believe childbearing must be tethered to the obligatory precondition of marriage. At the same time, 94 validated that marriage does not necessarily precede motherhood yet at present, they do not project single parenting on their future trajectories. Correspondingly, a plethora of nuanced perspectives has enriched the modern-day discussions on the interplay of marital status and intended parenthood, giving rise to new renditions of marital institutions and parenthood.

4.4. The social view of family and children's importance and the fertility security and family planning policies

4.4.1. Priorities Ranking

Given the contradicting forces between the governmental attempts to increase fertility rates and the empirical uprising of either few children or child-free-ness, the survey further devised a comparative index to check how the respondents weigh different life priorities. In aggregate, there were six factors included in the ranking: career, finance, physical and mental health, education and intellectual pursuits, romantic relationships and family and children.

Overall, the results indicated that a typical 22-38 Ho Chi Minh City woman would arrange their life focus according to the following order: physical and mental health, education and intellectual pursuit, finance, career, romantic relationship, and family and children. However, regarding the orders of the top priority, there is a slight difference, specifically that most women chose physical and mental health (25,79%), followed by finance (22.13%), education and intellectual pursuit (19.76 %), career (16.21%), romance (9.88%) and only 6.32% voted for family and children. The women who allocated career as the foremost life concern would be given a "career priority score" of 6 and the

score would decrease incrementally to 1 based on the priority's position, illustrated in Table 4.7. On the other hand, family and children were positioned low in this hierarchy by a substantial proportion of respondents as 110 and 81 placed it respectively at fifth (43.48%) and sixth (32.02%). This holistic ranking suggests a downward priority alignment across three perceived categories: personal well-being and capital(e.g. health and conditions), financial and career stability, and interpersonal relations among women in this age group in Ho Chi Minh City. Loosely translated, the outcome signals a diminishing emphasis on traditional family roles for a notable segment of the surveyed population.

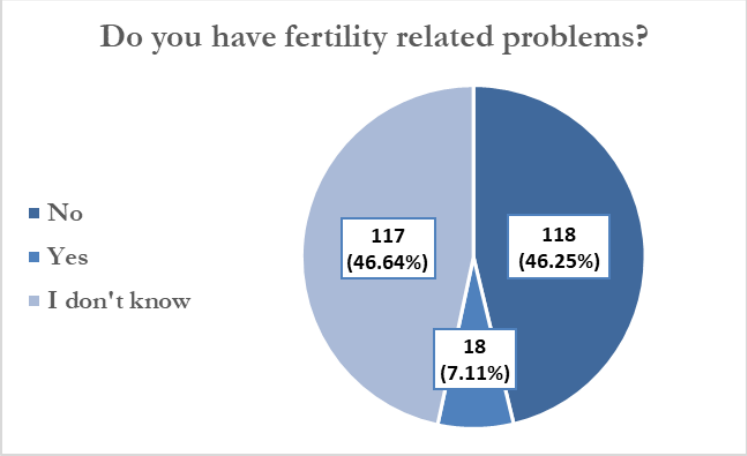
Table 4.7. Tabulation of Career Priority Score

Career Priority Score	Freq.	Percentage
1	63	24.9%
2	5	1.98%
3	20	7.91%
4	97	38.34%
5	27	10.67%
6	41	16.21%

4.4.2. Knowledge of fertility security and family planning policies

After gauging how individuals rate the importance of family and children, the survey assessed their future fertility security through a direct question asking if they have any issues that potentially impair their fecundity. Remarkably, the number of respondents being unsure about their fertility situation (118) is almost on par with those who certainly have no problems (117), each constituting around 46% of the sample. Selecting "I don't know" can be inferred that the respondent already sensed abnormalities with her physiological functions but has not undergone any check-ups to ensure normalcy or to screen prospective fertility issues. Unfortunately, 18 reported the presence of fertility-related issues, with half of them willing to disclose the symptoms they incur. In particular, four experienced polycystic ovaries and the others encountered problems such as uterine fibroids, ovarian cysts, polycistic ovary syndrome, low AMH level, endometrial hyperplasia or had experiences of irregular menstruation and past high-risk pregnancy.

Figure 4-7. Distribution of respondents having fertility issues (n=253)



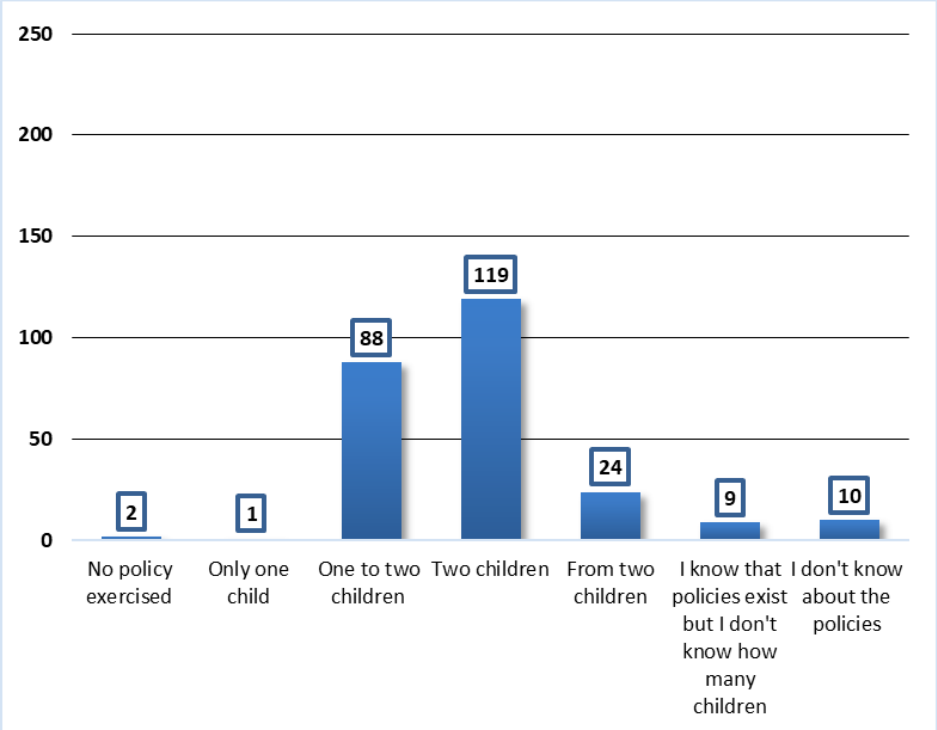
In addition to enquiring about the acknowledgement of their own fertility status, the survey sought information on participants' knowledge of the recommended number of children outlined in current family planning programs. At present, the policies encourage giving birth to two children in regions with low fertility rates like Ho Chi Minh City, moving on from the previous decade-long message of one-to-two maximum.

Within this sample, less than half of the total respondents, precisely 47.04% correctly answered while 34.78% mistook the current recommendations with the old campaigns and "from two children" were chosen by 24 individuals. However, the latter answer is to what extent acceptable since recent policy adjustments involve some equivocalities in the decrees of disciplinary actions, contingent on the subject of disciplinary actions.

For instance, officials, civil servants, and public employees, having a third child will be subjected to reprimands (Clause 9, Article 16 of Decree No. 112/2020/ND-CP dated September 18, 2020). Likewise, member parties violating population policy for the first time will be reprimanded while repeated violations or first violations causing serious consequences will result in warnings or even dismissal (Clause 1, Article 52 of Regulation No. 69-QD/TW dated July 6, 2022). Nevertheless, citizens will not be susceptible to any fines or punishment in such cases.

Despite these regulations, a small cumulative group of 8.69% of respondents remain unaware of the policies, or the number of children allowed, or believe that no population policy is in effect. This paucity of knowledge should warrant attention from population policymakers to imperatively enhance the circulation and consistency of family planning messages.

Figure 4-8. Responses to the number of children allowed in family planning policies (n=253)



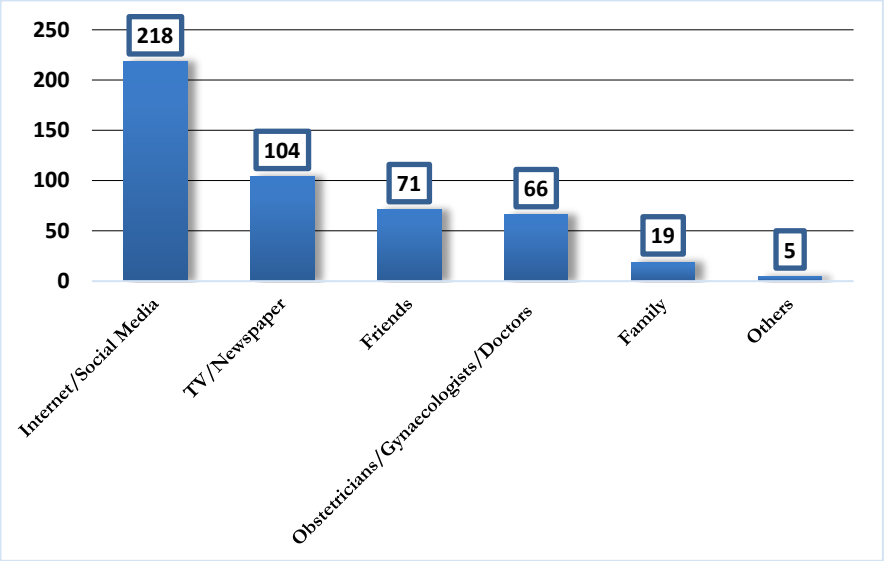
In light of the ambiguities surrounding the allowable children quantity and disciplinary actions, the survey consulted the attitudes of the respondents if they "dare" have a third child. With this question, 243 voiced their opinions and expectedly, the majority totalling 107 respondents rejected the idea. Following closely, 72 respondents were still reluctant and thus opted for "it depends". Conversely, only 32 people declared the willingness to proceed with a third child notwithstanding the apprehension emanating from the inconclusive discipline rules. And lastly, also 32 people admitted that "I don't know (if I dare or not)". Overall, the minority of certain and positive respondents when it comes to the third-child daring signals the obligation to resolve ambiguities for informed family planning and create a conducive environment for households desiring multiple children in provinces where fertility rates need improving.

Chapter 5 Findings and Discussions

5.1. Perceptions about SEF

Revisiting the prime premise of this study, which posits that integrating awareness of social or elective EF in family planning campaigns can bestow on couples, and especially women the feelings of "breathing space", the study thus had conducted a thorough examination of how women in Ho Chi Minh City perceive this method. To begin, the respondents were directed about their familiarity with this assisted reproductive technology. Within the surveyed sample, a striking number of respondents 239 (94.47%) reported being cognizant of its existence and exercise. Over 91% of these individuals knew about SEF through social media or the Internet. The dissemination of this technology through other channels of information, for example, TV/Newspaper, Friends, Doctors or Medical Specialists and Family were dispersed at varying levels across the sample. Respondents also cited sources such as academic studies, documentaries, job postings or a "celebrity" obstetrician and gynaecologist. On a personal note, one participant shared "I have the demand for OC, so I have extensively researched and even consulted with a doctor.". As for the 14 respondents who had not recognized this method, they were presented with a descriptive text that outlines what SEFis, how it was developed and what the procedure entails.

Figure 5-1. Channels that respondents received information about SEF from (n=253)

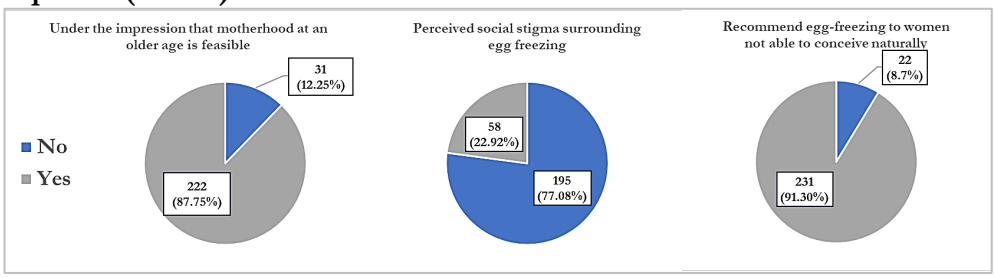


Source: Own Survey 2023

Subsequently, the whole sample was collectively asked the following three questions: whether information about SEF gave them the impression that becoming a mother at an older age would be feasible; whether they perceive any social stigma surrounding this technology and whether they would recommend it for other women in case of impossible natural conception. In general, the results showcase immense optimism, open-mindedness and the

burgeoning utilization of SEF. Firstly, an overwhelming majority of 222 respondents (87.75%) believed that SEF enables motherhood at a more advanced age. Simultaneously, there witnessed an evident prevailing acceptance of this technology in Vietnamese society since more than three-quarters of the respondents dismiss any social stigma associated herewith. Lastly, the outcomes capture a salient inclination among this sample to advocate for SEFas an impressive 91.3% (231 respondents) stated they would refer the treatment to peers confronting obstacles in natural conception. In essence, these positive findings reveal a widespread acknowledgement of advantages delivered by reproductive technologies in conditioning female fertility within a more extended timeline. Hereby, they bring forth the prospects that societal norms are increasingly receptive towards embracing alternative methods for family planning and the informed individuals concurrently develop a strong sense of trust and endorsement to those found in difficult childbearing situations.

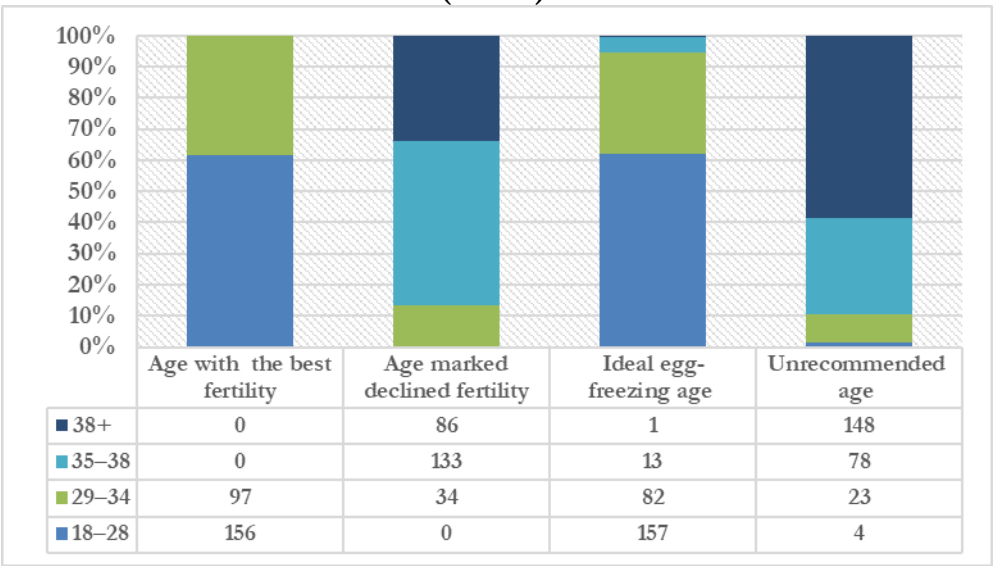
Figure 5-2. Distribution of responses to questions about sef perceptions (n=253)



Source: Own Survey 2023

To effectively harness this technology for a secure reproductive future, a solid foundation of trust and positivity should be coupled with a sound knowledge base. Accordingly, the study examined the level of age-related fertility knowledge across the sample on four aspects: the most fertile age, the age marked by declined fertility, the optimal age for EF treatment and the unrecommended age for the treatment. Extensive obstetrician studies have documented that broadly 18-28 years (Hodes-Wertz et al., 2013) feature the highest fertility in women (Hodes-Wertz et al., 2013) and the interval 35-38 years is agreed as the turning point for reproductive health (Garcia et al., 2018). As for EF contemplation, at above 38, IVF success rates will not be guaranteed (Cil, 2013) and it is advisable to complete the procedure ideally before 35, yet not too early to be cost-effective. 29-34 will thus be deemed to be the middle ground and also at around this period, female fertility begins to deteriorate (Hodes-Wertz et al., 2013; Garcia et al., 2018). Figure 5-3 below summarizes the frequency of answers to each question.

Figure 5-3. Distribution of responses to age-related fertility knowledge (n=253)



	Age with the best fertility	Age marked declined fertility	Ideal egg-freezing age	Unrecommended age
38+	0	86	1	148
35–38	0	133	13	78
29–34	97	34	82	23
18–28	156	0	157	4

Source: Own Survey 2023

More than half of the respondents answered correctly each question, signalling a sufficient level of understanding of female physiology. Besides, the outcomes show no impending signs of overestimating the fertility window yet it would be greatly practical to emphasize that fertility will decrease gallopingly at the age of 35. However, there are some misconceptions about the optimal age of OC as 157 (62.06%) respondents opted for the 18-28 range. Indeed, it is prudent to recommend this treatment before 35 yet the fact that SEF is by no means cost-effective should be seriously heeded.

The total costs of the whole procedure offered by prestigious hospitals specializing in obstetrics and gynaecology in Ho Chi Minh City typically range from 70 to 80 million VND (approx. $3265/€3000) (Bệnh viện Từ Dũ, 2022). To break it down, a single round of ovarian stimulation and egg retrieval would cost around 60-70 million and vitrification costs vary depending on the number of eggs and freezing tubes. Specifically, the first tube is 4.5 million VND and the following tubes are priced at 1.2 million VND each. Alongside this, the annual storage fee for the first tube is 2 million, and each subsequent tube is 500 thousand VND (Bệnh Viện Hùng Vương, 2020). Within the sample, 229 respondents disclosed their monthly income and the mean wage in this group is nearing 18 million VND. Therefore, considering EF requires dedicating 4-5 months of one's salary. As a result, while spreading awareness of this treatment, information about the costs must be fully complemented at all times. Inarguably, women not only deserve to be fully cognizant of the available fertility-preserving options at their disposal but should also be fully equipped to assess the affordability and plan accordingly.

5.2. EF as a viable family planning option

In this study, the adoption of SEFis argued to be prompted by risk aversion regarding career security. The first aspect to be explored is whether EF is

seen as a viable family planning option. In total, 244 (96.44%) respondents asserted the belief that this method is a device for childbearing plans to prevent difficult natural pregnancies in the future. A binary logistic regression was run to test this hypothesis and the log-odds ratios are presented in Table 5.1.

Table 5.1. Logistic regression estimates of "Viable" dependent variable

Variables	Perception of Viability
Risk Aversion Score	0.0119*
	(2.00)
Age	0.0139
	(1.40)
Unmarried	-0.0152
	(-0.31)
Atheist	-0.0241
	(-0.54)
Straight	-0.0275
	(-0.58)
Status1 (Above average and Well-off)	0.00885
	(0.32)
Number of children	-0.0213
	(-0.50)
Number of siblings	-0.00871
	(-0.50)
Studying	0.0766
	(1.23)
Working	0.0273
	(0.63)
Years of working experience	-0.00932
	(-1.04)
Public	0.0424
	(0.53)
Private	0.00706
	(0.12)
Multinational	-0.0227
	(-0.35)
Other Sector	-0.101
	(-1.42)
Full-time	-0.0185
	(-0.35)
Freelance	0.0194
	(0.20)
Upper-high school requirement	0.108
	(0.76)
University requirement	-0.0305
	(-0.30)
Post-graduate requirement	-0.104
	(-0.93)
Upper-high school level	-0.461
	(-0.01)
University level	-0.307
	(-0.01)
Post-graduate level	-0.390
	(-0.01)
Years of schooling	0.000765
	(0.09)
Studying higher	0.00206
	(0.06)
Number of desired children	0.0449
	(1.88)
No gender preference	0.0470
	(1.19)
Marriage needed for childbearing	0.0417
	(1.35)
Single mom plan	-0.0119
	(-0.33)
Single mom	0.0547
	(0.43)
Having fertility problem	-0.0990
	(-1.91)
Having no fertility problem	-0.0162
	(-0.49)
Third child dare	0.0189
	(0.43)
Family priority score	0.00910
	(0.60)
N	253
Pseudo R2	0.4964
Log likelihood	-19.569932

Standard errors in parentheses; ***p < 0.01;**p < 0.05; *p < 0.1.

The results show that for every one-score elevation in the Risk Aversion Score, there is a 1.19 percentage-point increase in the possibility that a person deems SEFas a plausible contingency plan and the effect is statistically significant. Moreover, fertility-related problems and the number of desired children exert marginally significant effects. Holding other variables constant, every additional child desired leads to a rise of 4.5% points in appraising SEF as viable. Contrarily, the probability of respondents grappling with fertility problems complemented it in family planning decreased by 1.6% points. This finding is valid since the mentioned issues must be predicated on complex treatments whereas OC carries preventative connotations. Other variables about demographic backgrounds, working sectors, job requirements and educational levels do not appear to impact this belief.

5.3. The willingness to adopt social egg freezing in general

Table 5.2. Frequency of responses for WTA and WTA_Problem

	WTA Frequency	WTA_Problem Frequency
Extremely unlikely	17	12
Unlikely	25	18
Neutral	95	64
Likely	87	116
Extremely likely	29	43

The second hypothesis of this study posits the causality of risk aversion on the general WTA SEF to secure a reproductive future. Since the dependent variable consists of five incremental levels of likelihood, which are "extremely unlikely", "unlikely", "neutral", "likely", and "extremely likely", an ordered logistic regression test was conducted. Figure 5-4 illustrates the distribution of responses for each level.

The model was constructed based on the assumption that the proclivity for any fertility-related decision is consulted with the opinions of the family members or partner. As such, the model further controlled for the educational level of the parents and whether a person is currently in a committed relationship. Besides, sexual behaviours are accounted for in the regression given that EF treatment involves a relatively invasive medical process, which might impede individuals who are not sexually active or not routined with taking contraception. Table 5.3 illustrates the marginal effects of the outcome prediction of five levels[10].

[10] For categorical variables Sexuality, Religion, House Status, Sector, Time, the reference categories are: Straight, Atheist, Under Average, Informal and Part-time.

Table 5.3. Ordered logit marginal effects of "WTA" and "WTA_Problem" dependent variable

		WTA	WTA_Problem
Risk Aversion Score			
	Extremely unlikely	-0.00971**	-0.00395*
		(-3.05)	(-2.04)
	Unlikely	-0.0104***	-0.00479*
		(-3.32)	(-2.14)
	Neutral	-0.0131***	-0.00975*
		(-3.54)	(-2.33)
	Likely	0.0183***	0.00655*
		(3.82)	(2.19)
	Extremely likely	0.0149***	0.0119*
		(3.49)	(2.29)
Studying			
	Extremely unlikely	-0.0911*	-0.0834*
		(-2.11)	(-2.55)
	Unlikely	-0.0976*	-0.101**
		(-2.11)	(-2.62)
	Neutral	-0.123*	-0.206**
		(-2.21)	(-3.05)
	Likely	0.172*	0.138**
		(2.28)	(2.73)
	Extremely likely	0.140*	0.252**
		(2.19)	(3.00)
Upper high-school requirement			
	Extremely unlikely	-0.0801*	-0.00269
		(-2.05)	(-0.11)
	Unlikely	-0.0858*	-0.00327
		(-2.12)	(-0.11)
	Neutral	-0.108*	-0.00665
		(-2.09)	(-0.11)
	Likely	0.151*	0.00446
		(2.19)	(0.11)
	Extremely likely	0.123*	0.00814
		(2.14)	(0.11)
Upper-high school level			
	Extremely unlikely	0.0508	0.0766*
		(1.22)	(2.28)
	Unlikely	0.0544	0.0929*
		(1.22)	(2.43)
	Neutral	0.0686	0.189**
		(1.25)	(2.67)
	Likely	-0.0959	-0.127*
		(-1.25)	(-2.48)
	Extremely likely	-0.0779	-0.232**
		(-1.24)	(-2.63)
Number of desired children			
	Extremely unlikely	-0.0275**	-0.0169*
		(-2.69)	(-2.41)
	Unlikely	-0.0294**	-0.0205*
		(-2.84)	(-2.55)
	Neutral	-0.0371**	-0.0418**
		(-3.14)	(-2.96)
	Likely	0.0519**	0.0281**
		(3.18)	(2.60)
	Extremely likely	0.0421**	0.0512**
		(3.05)	(2.90)
Partner			
	Extremely unlikely	-0.0366	-0.0316*
		(-1.81)	(-2.21)
	Unlikely	-0.0392	-0.0383*
		(-1.86)	(-2.29)
	Neutral	-0.0495	-0.0779*
		(-1.94)	(-2.51)
	Likely	0.0692*	0.0523*
		(1.96)	(2.34)
	Extremely likely	0.0562	0.0955*
		(1.90)	(2.49)
N		253	253
Pseudo R-squared		0.1258	0.1356
Log pseudo likelihood		-308.1602	-292.8617

Standard errors in parentheses; ***p < 0.01;**p < 0.05; *p < 0.1.

The results demonstrate consistent and statistically significant evidence that risk aversion regarding career security affects the decision to embrace EF to combat prospective fertility decline. One score higher in the Risk Aversion Index leads to the likely and extremely likely inclination by 1.83% and 1.49% points while simultaneously resulting in a 0.97%, 1.04% points decrease in the probabilities of extremely unlikely and unlikely sentiments. In essence, the Risk Aversion Index predicts the higher likelihood of one opting for SEF to ensure reproductive capacity.

Similar consistency and direction of effects were witnessed amongst women who are studying or working in jobs with upper-high school requirements. Precisely, the likelihood and the extreme likelihood of WTA will increase by 17.20% and 14.00% percentage points or 15.1% and 12.3% respectively for women in such instances. The age of the women still in school in this sample ranges from 22 to 29. Typically, most Vietnamese university students graduate with a four-year degree at 22, thus this variation implies that most of them are attending prolonged degrees such as engineering or medical and dental sciences, or are pursuing postgraduate levels. It has been studied that people staying longer in academia develop steeper age-income profiles and consequently have children later (Mills, 2011). On the other hand, occupational upper-high school requirements mean that a woman must have completed intermediate vocational school or college. These two educational levels are below university and take 1-2 or 2-3 years to finish (Article 33, Law on Vocational Education 2014) and the starting wage coefficients for these degrees are lower (Decree 204/2004/NĐ-CP). As a result, in the long term, they are also susceptible to steep wage profiles compared to peers graduating just one to two years later with with immediately higher initial wage. Therefore, it is reasonable that women in this subgroup tend to consider available options to safeguard their motherhood prospects.

The number of anticipated children also exhibits predictive patterns. Every additional expected child robustly raises the two top-tier likelihood by 5.19% and 4.21% points while negatively impacting the three other levels. All in all, the concordance of these factors mirrors the empirical discourses about women undertaking SEF out of the fear of unwanted childlessness and the indispensable role of a partner supportive of shared parenthood (Baldwin et al., 2018).

5.4. The willingness to adopt social egg freezing in case naturally conceiving is impossible

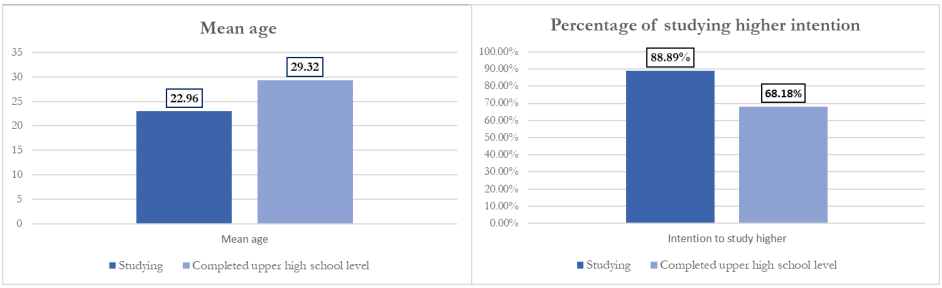
Finally, the survey inspected the causality of risk aversion to the WTA on the pretext of one's being incapable of conceiving naturally. The ordered logistic regression still applies yet hereby excludes the current number of children and the fertility problems. Besides, the aspects devise implicitly a hypothetical scenario where past attempts to conceive had proven futile, so the model does not control for the history of sexual practices or contraception usage. The frequency of each likelihood level is depicted in Figure 5-3 and the marginal effects are detailed in Table 5.2 in the previous section.

The outcomes once again strongly substantiated the hypothesis of the study. Holding other variables constant, in case a person faces difficulty in getting pregnant, one score increase in the Risk Aversion Index will increase the level of "likely" and "extremely likely" by 0.66% and 1.19% points while congruously decrease the "unlikely" and "extremely" willingness by 0.48% and 0.40% points. With this outcome, it is sufficient to conclude that the risk aversion concerning career security positively triggers the perceptions of viability and WTA SEF. Remarkably, this conclusion holds in both impartial circumstances and imaginary scenarios of potential infertility.

Likewise in the previous tests, the number of desired children continued to exert consistently positive impacts on the highest levels of WTA. In this scenario, for wanting one additional child, the incremental likelihood to consider EF will rise by 2.81% and 5.12% points. Therefore, the tendency towards SEF is determined throughout by one's attitudes towards risk and the desired children quantity. Drawing from this, if a woman adamantly decides to be child-free, family planning policies will perhaps hardly be able to alter their viewpoints even through disseminating the assistance of reproductive technologies. Consequently, there must be some structural societal changes in encouraging women to realize the appeal and benefits of motherhood.

In terms of human capital, studying women continued to be bound to SEF treatment when having no options to get pregnant naturally. Compared to the general WTA, the effects are even more robust as being still at school raises the likely and extremely likely probability of seeking SEF in this situation by 13.80% and 25.20% points. Conversely, women who completed upper-high school levels negated this tendency. To be specific, having completed these degrees will cause a 12.70% point decrease in the "likely" outcome and a significantly 23.30%-point drop in the "extremely likely". One plausible explanation for this contradiction is the optimistic projection versus the present incurrence of age-income profile steepness, which could be reasoned by the mean ages and the intention of pursuing higher degrees within these three cohorts. The contrast of these two factors within the three cohorts is portrayed in Figure 4-6.

Figure 5-4. The mean age and the proportion of respondents wanting to achieve higher degrees among the three cohorts



Source: Own Survey 2023

As observed, the studying cohort has the youngest mean age and the highest proportion intending to study up. In addition, this group is at present not in the labour market so their perceptions are deprived of actual occupational bindings and wage profiles. On the other hand, the other two groups,

given the older age average and sufficient work qualifications, hence more work experience and lesser ambition for further studies. Concerning these factors, their perspectives are more pessimistic since the expenses for complete EF procedures will consume a substantial amount of their income on top of the inherent earning profile steepness. Theoretically speaking from the prospect theory, the un-eagerness from those with upper-high school and advanced educational levels is due to the non-linear weighting of future possibilities (Kahneman & Tversky, 1979). In this context, they overweight probabilities that are more certain (income loss) instead of ambivalent prospects of definite infertility.

Lastly, in this hypothesis, the presence of a romantic partner exerts an upward influence on embracing SEF Specifically, having a committed partner increases the likelihood and extreme likelihood to undertake SEF by 3.91% points and 9.73% points. Opposed to the previous test for general circumstances, the effects in this case are both consistent and statistically significant at a 95% level. This pattern is noteworthy for discussion as a study amongst couples with fertility problems in Vietnam has reported that more than 2/3 of them affirmed the consideration for assisted reproduction and almost all are deeply hopeful about medical technology in aiding their pregnancy journey (Wiersema et al., 2006). In essence, the outcomes consolidated the cruciality of a partner in the pathways leading to childbearing, especially in case of compromised reproductive capacity.

5.5. Robustness checks

All the models were performed once again yet limiting to respondents who have known of SEF before the survey. Regarding the perception of the viability model, the test later does not render Risk Aversion statistically significant. However, given the inherent invariability within the responses, as almost 95% affirmed viewing SEF as feasible, the outcomes insinuate that this opinion holds regardless of how risk-tolerant one is. Nonetheless, when not accounting for the preconditioned knowledge, risk aversion does exhibit a vital causal link.

With respect to the general WTA, the Risk Aversion Score became even more statistically significant and the effect is also more powerful as one score in this case leads to a 1.87% and 1.51 %-point rise in the likely and extremely likely response. Therefore, the WTA is proven to be without any bias from the information given in the survey. Moreover, for those who have had certain knowledge of this technology, risk aversion dictates fundamentally the likelihood of treatment in general.

Table 5.4. Multinominal logit marginal effects estimates for WTA and WTA_Problem among the respondents having heard of SEF

Variable	WTA | Heard of SEF before	WTA_Problem | Heard of SEF before
Risk Aversion Score		
Extremely unlikely	-0.0105**	-0.00381
	(-2.95)	(-1.81)
Unlikely	-0.0105**	-0.00386
	(-3.19)	(-1.85)
Neutral	-0.0127***	-0.00871*
	(-3.33)	(-1.99)
Likely	0.0187***	0.00558
	(3.62)	-1.86
Extremely likely	0.0151***	0.0108*
	(3.39)	-1.99
Unmarried		
Extremely unlikely	-0.00389	0.0185
	(-0.12)	-0.93
Unlikely	-0.00389	0.0188
	(-0.12)	-0.93
Neutral	-0.00469	0.0423
	(-0.12)	-0.94
Likely	0.00689	-0.0271
	(0.12)	(-0.94)
Extremely likely	0.00557	-0.0525
	(0.12)	(-0.94)
Number of siblings		
Extremely unlikely	0.000726	-0.0135*
	(0.08)	(-2.00)
Unlikely	0.000726	-0.0137*
	(0.08)	(-2.04)
Neutral	0.000876	-0.0309*
	(0.08)	(-2.24)
Likely	-0.00129	0.0198*
	(-0.08)	-2.07
Extremely likely	-0.00104	0.0384*
	(-0.08)	-2.24
Studying		
Extremely unlikely	-0.100*	-0.102**
	(-2.13)	(-2.76)
Unlikely	-0.100*	-0.103**
	(-2.14)	(-2.73)
Neutral	-0.121*	-0.233***
	(-2.22)	(-3.39)
Likely	0.178*	0.149**
	(2.29)	-2.81
Extremely likely	0.144*	0.289***
	(2.25)	-3.43
Upper-high school requirement		
Extremely unlikely	-0.0855*	0.00493
	(-1.99)	-0.18
Unlikely	-0.0855*	0.005
	(-2.05)	-0.18
Neutral	-0.103*	0.0113
	(-1.99)	-0.18
Likely	0.152*	-0.00722
	(2.11)	(-0.18)
Extremely likely	0.123*	-0.014
	(2.06)	(-0.18)
Upper-high school level		
	0.0468	0.0739*
Unlikely	(1.04)	-2.12
	0.0468	0.0749*
Neutral	(1.04)	-2.18
	0.0564	0.169*
Likely	(1.06)	-2.37
	-0.0829	-0.108*
Extremely likely	(-1.06)	(-2.23)
	-0.0671	-0.209*
Number of desired children	(-1.05)	(-2.36)
Extremely unlikely	-0.0278*	-0.0190*
	(-2.54)	(-2.47)

	Unlikely	-0.0278**	-0.0193*
		(-2.65)	(-2.53)
	Neutral	-0.0336**	-0.0435**
		(-2.93)	(-3.02)
	Likely	0.0493**	0.0279*
		(2.96)	-2.56
	Extremely likely	0.0399**	0.0540**
		(2.87)	-3.02
Partner			
	Extremely unlikely	-0.0427	-0.0408*
		(-1.85)	(-2.47)
	Unlikely	-0.0427	-0.0413*
		(-1.89)	(-2.49)
	Neutral	-0.0515*	-0.0932**
		(-1.96)	(-2.94)
	Likely	0.0757*	0.0597**
		(2.00)	-2.58
	Extremely likely	0.0612	0.116**
		(1.95)	-2.92
	N	239	239
	Log likelihood	-293.1567	-270.4367
	Pseudo R2	0.1272	0.1464

On the other hand, risk aversion no longer maintains its vigorous influence amongst those who had formerly familiarized themselves with SEF and experienced impediments in getting pregnant. Still, one score increase in the Risk Aversion Index provokes 1.08% points in the most propensity to undergo the treatment. However, given two conditions alongside previous knowledge and fertility problems, it is apprehensible that there are other unobserved heterogeneity in provoking the eventual WTA.

Table 5.5 Marginal effects of Risk Aversion Score on WTA_Porblem dependent variable among the respondents with previous knowledge of SEF

Variable	dy/dx
Risk Aversion Score	
1._predict	-0.00381
	(-1.81)
2._predict	-0.00386
	(-1.85)
3._predict	-0.00871*
	(-1.99)
4._predict	0.00558
	-1.86
5._predict	0.0108*
	-1.99

Secondly, to examine the construction of the models, Hosmer–Lemeshow goodness-of-fit tests were carried out. As for the first one, since it is a nominal logit model, pseudo-R^2 is also a typically applied indicator to assess the goodness-of-fit. In the test where the perception of viability was the dependent variable, pseudo-R^2 = 0.4964, which is appraised as a very good fit in both the benchmarks of McFadden (1979) and Backhaus et al.(2006) and is borderline that of Cragg and Uhler (1970), where >0.5 signals a very good fit (Hemmert et al., 2018). Afterwards, the Hosmer–Lemeshow test was implemented to examine in-depth. The p-values for the three tests were 0.17, 0.57 and 0.08 (>0.05), respectively, so the goodness-of-fit is proven in all three models. Moreover, the Hosmer–Lemeshow test was repeated for the models including only people having pre-survey knowledge of social-EF and the goodness-of-fit still holds, indicating the models accurately represent the underlying patterns and relationships of risk aversion regarding career security and WTA social-EF in both aspects and circumstances.

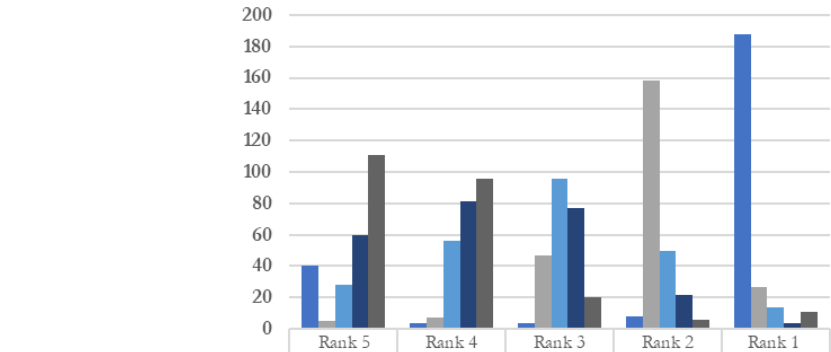
Finally, to examine the validity of the Risk Aversion Score' combined effects, the seven indices were split and run separately in the previous models. Upon replicating the nominal logit models, there was no singular index detected with statistically significant effects. On the other hand, in retesting the ordered logistic regressions, statistical significance was found with career priority score, career score and discipline score in the WTA dependent variable while only career priority holds the power in the WTA_Problem model. Given the aforementioned results for the goodness-of-fit test, it can be concluded that the convergence of independent indices encapsulated in the Risk Aversion Score is valid in interpreting the full picture of the causal links between risk aversion regarding career security and the WTA SEF.

5.6. Comparing reproduction options

The comprehensive attitudes towards EF are also examined through how people arrange their order of favoured methods to achieve pregnancy. In particular, the survey requested the respondents to rank their choice preference with the five methods, namely natural conception, assisted reproduction technologies with autologous eggs (e.g. IVF, donated eggs, freezing embryos,..), adoption, surrogacy and not wanting children at all. With this query, 242 responses were recorded.

Essentially, the most prevailing would comprise the following sequence: natural conception, assisted reproductive technologies, adoption, surrogacy and not having children. Out of the five methods, natural conception was the most desirable as chosen by 188 respondents, accounting for 77.05% of the whole sample, followed by assisted reproduction (27; 11.07%), adoption (14; 5.74%), no children (11; 4.51) and ended with surrogacy (4; 1.64%). On the contrary, being child-free is the last resort among 111 respondents (45.85%). Remarkably, out of the people who prioritize natural conception utmostly, 82.45% would make assisted reproductive technology the adjacent contingency plan. On top of that, this method is also more consistently selected as the top and second choice even amongst those who input null for the number of desired children. Cumulatively, 58.18% (32) of respondents who were against motherhood intention voted for assisted reproductive technology as the most favoured method. The detailed ranking detailed frequency is luustrated in Table 5.6.

Table 5.6. Ranking of favourable reproduction options (n=242)



	Rank 5	Rank 4	Rank 3	Rank 2	Rank 1
Natural Conception	40	4	4	8	188
Assisted Reproductive Techonology	5	7	47	158	27
Adoption	28	56	96	50	14
Surrogacy	60	81	77	22	4
No children	111	96	20	6	11

Source: Own Survey 2023

Given the penchant that is only inferior to natural pregnancy, the popularity and comprehension of assisted reproductive technology are manifestly more widespread and foreseeably, it will become a mainstream manner to preserve fecundity potential in the near future. In the specific case of OC, enhancing the assurance and relief to extend the ability to have one's own biological children is arguably the primary motive for researching and selecting the treatment (Myers, 2017). Essentially, it is a medically scientific springboard for biogenetic

motherhood and advanced insurance for ensuring healthy childbirths and safeguarding biological risks of age-related infertility or chromosomal abnormalities (Argyle et al., 2016). Furthermore, the emphasis on genetic ties sheds light on the cruciality of genetics in the innate human drive to reproduce, giving priority to biological assistance to procreation over non-biological alternatives (Hodes-Wertz et al. 2013). In actuality, even amongst infertile couples in Vietnam, the discussion of adoption was brought to the table by only a minority. The idea is conducive to immediate objection essentially because of the aspirations for one's own biological offspring and the sense that an adopted child will by no means become an authentic kinfolk.

Moreover, one might argue that via surrogacy, one can still obtain genetic bonds with the children. In Vietnam, specifically, the enactment of altruistic surrogacy among close relatives came into force in 2015. However, surrogacy is permitted only under stringent conditions and scrupulous examinations designated by specialised hospitals. Still, it is not without loopholes, which brokers make use of to commercialize the method and thus, concerns about the ethicality of surrogacy might hinder couples from employing this (Hibino, 2019). Another common alternative that is fraught with moral concerns and disputes due to conflicting religious or cultural views is embryo preservation. For instance, the future of the embryo will be undecided or if the previously intended parents part ways (Argyle, 2016). In contrast, EF is deemed an acceptable alternative to frozen embryos (Ghazeeri et al., 2023) and the decision to undergo the treatment or subsequently to thaw the eggs for pregnancy is wholly at the woman's disposal. Consequently, EF as a form of reproductive technology carries ethical connotations and medicalization to alleviate the fast tickling timeline of fertility and also equips them with autonomy for their health behaviours (Dondrorp et al., 2012).

All in all, through this study, the increasing openness and acceptance toward SEF or other reproductive methods for non-medical reasons have been a culmination of several dynamics related to the attitude of risks. Not only do women develop risk-averse tendency towards the ambivalent prospects of job stability and human capital development, but more humanely because of the tremendous preoccupations with risking optimal fecundity timeline and biogenetic motherhood in exchange for career advancement. Therefore, perhaps not only limited to SEF, reproductive alternatives that can bestown upon women more "biological clock" without exceeding burdens of weighting up risky prospects should be endorsed.

Chapter 6 Concluding Remarks and Policy Implications

6.1. Policy Implications

In Vietnam, there persist multifaceted pressures on women into the must of being a mother at one point. Society often stigmatizes childless women (Hibino, 2019) and concurrently, the long-existing population policies have orientated women into a certain marital and childbearing age and the number of wanted children (Ngo, 2022). However, given the high female labour workforce participation and the imperative to improve labour productivity to boost economic performance, women have been more invested in their human capital and occupational trajectories. The concerns for career in parallel with marriage and motherhood aspirations amongst women in Ho Chi Minh City, the economic hub of Vietnam as well as the lowest fertility religion, have been specially characterized and discussed in this study.

Through the employment of nominal and ordered logistic regressions, the study substantiated the hypothesis that risk aversion regarding career security prompts women towards the positive likelihood to undertake SEF. With this conclusion, it is vital to realize the striking effects of perceived motherhood wage penalty on fertility decisions beyond conventional matters of getting married and having children. At the same time, the effect of career concerns behind the trend of child-freeness or distrust in marriage are acknowleged. Since the government has attemtpted to deliver more social benefits and workplace environment for married women with children, this study proposes a few initiatives regarding the topic of SEF aiming at young and single women who might not yet contemplate marriage and childbearing in the near term but do have certain intentions for these life events.

The study has demonstrated that the frequent compliance with family planning policies in an authoritarian like Vietnam has transformed regulations into social norms. Therefore, the study proposed an extension to the guidelines of "marriage before 30 and two children before 35" through the suggestion of adopting SEF as a method to invite more reproductive autonomy while keeping women fully alarmed of their fecundity limits. On top of that, given the exploration of contemporary perspectives, for instance, on the high level of familiarity, openness and reception towards assisted reproductive technology or SEF in the scope of this study. Given such optimistic outlooks, the study advanced that this technology can be applied as a medicalization solution for demographic issues of low birth rates and aging population where women prepare herself preemptively before nearing fertility decline while remaining diligent in building up career and properties. Therefore, first and foremost, similar to the past reverberating public health campaigns about contraception or abortion, imformation about assisted reproductive technology in general or EF in particular should be incorporated to educate and inform women that they have the available options to prolong fertility timeline.

Secondly, unlike mainstream contraceptive devices, SEF treatment incurs substantial costs and requires specialized medical consultations. Consequently, women should be fully cognizant that SEF is not equivalent to an affordable short-term plan, rather it serves as a premium proabilistic insurance. With this procedure, they purchase the peace of mind and protect themselves against unhappy scenarios stemming from involuntary childlessness or hastily made marital decision. For that reasons, service fees should be transparently regulated to prevent common illegal commercialization or law brokerage like in the case of surrogacy. Additionally, the information channels should be arranged through both public campagins and specialized obstetrician clinics to prepare the women thoroughly and avoid post-treatment dissatisfaction. Physicians play a responsible role in advising young women on the prime age for the best success rates while keeping cost-effectiveness into account. Currently, although the laws of SEF in Vietnam do not impose an age limit-a positive aspect allowing women to seek the treatment at their discretion-there should be an advisory threshold to keep women alert egg decrease in quality after a certain point, rendering pregnancy futile regardless of the expensive medical interventions.

And lastly, given the relatively developed yet not restrictive regulations of SEF procedures of the Vietnamese government compared to the neighbours in South East Asia, this can be an opportunity for establishing health tourism, especially with fertility treatments. At the moment, the costs for SEF in Vietnam ranges around $3000 to $35000, quite comparable to the prices of Indonesisia ($3500) and Thailand (around $3000) and remarkably less than in Taiwan($4400) or Japan($4800) (Kok et al., 2022). In addition, the laws of SEF in Vietnam has certain advantages, such as no fixed constraints on the starting and ending age for egg storage, no age limits for in vitro fertilization procedures, no requirement of being married or the cooperation of a lawful spouse at the time of fertilization, and definitive discard of eggs in case storage and preservation fees are not completed within 6 months. Studies in the Western countries have pointed the fact that there are women who travelled to a different country, for instance to Spain, South Africa, Thailand and Argentina (Baldwin et al., 2017) to receive the treatment. The key objective factors that motivated to travel and undertake SEF procedures abroad include: the otherwise unavailability of treatment in the home country, the affordability and more advanced state of the technology overseas. In the field of Obstetrics and Gynaecology, Vietnam has state-funded and top-referral hospitals such as Tu Du in Hochiminh City, Bach Mai in Ha Noi, or Hue Central Obstetric and Gynecological Hospital (Hibino, 2019) where yearly they can welcome 10.000 infertile couples, receive 20.000 visits and carried out 2000 cycles of IVF (Wiersema et al., 2006). Thus, with the established capacity, the guaranteed service and corresponding affordability, there are a multitude of potentials for Vietnamese governments to maximize the supply for infertility treatments.

6.2. Limitations and Conclusion

Within the urban settings of Ho Chi Minh City, the study concretely conveys the standpoints of women in most economically advanced region yet characterized with lowest births rates, which gives rise to two notable narratives. Firslty, the female's risk tolerance pertaining to their working status will

shape their decisions on both traditional fertility behaviors and an unconventional reproductive techonology adoption. And secondly, even with a more urban and educated sample compared to the population, the perceptions about marrital and child-having timing and contraception take-ups overlay substantially with the general family planning policies' suggestions.

Within this full picture, there emerge some distinctive patterns such as the imminent gap between the desired and intended number of children, the salient rising trend of child-freeness and the unprecedented optimistic perceptions of SEF. As all the South of Vietnam experiences below replacement fertility rates, the findings from Ho Chi Minh City women can set the foundation for forecasting and comprehending the factors leading to this phenomenon and how Southern women react to current family planning policies. Besides, this study desgin can be translated into other neighboring urban areas in the Southeast region or large cities in the Mekong Delta to deduce some regional commonalities in the family planning perspectives.

Despite signalling impressive open-mindedness and remarkable adoption rates, the study did not have measures to appraise objectively how profound the respondents' knowledge of SEF was. In addition, the optimism could be derived from being not yet informed of the cost-effectiveness. Therefore, despite a solid construction of risk aversion index, the underweight of cost factors might impact the overall interplay of risk attitudes. Therefore, to inspect in-depth the behavioral and economic aspects of social egg-freeing, future research about this topic in Vietnam should delve in to the willingness to pay and precisely how much is a person willing to pay for the whole or partial uptake of this treatment. Moreover, health insurance or employer' benefits package raise potential investigations about who should fund the treatments or how it should be funded or proportionately covered. And lastly, while this study reasonably endorses a medicalization technology, yet with the large expenses for the procedure, future research should be vigilant with infomarion assymetry or potential disparities of adoption rates between female of different income groups.

In conclusion, the study has offered valuable insights into the intricate dynamics between risk aversion, fertility-related factors, and the decision-making process amongst women on the adoption of a novel assisted reproductive technology, namely SEF. In addition, it highlights the efficacy of family planning programs on moulding social family-building norms and accordingly suggests how it can be updated to befit the updated female lifestyle and aspiratons while still upholding demographic structure.

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Appendices

Appendix I - Survey

Block: Demographics

1 Do you identify yourself as female?
- o No
- o Yes

2 Are you currently living in Ho Chi Minh City?
- o No
- o Yes

3 How old are you?

4 Have you ever been married?
- o No
- o Yes, I am married
- o Yes, I was married

5 Are you living in an urban district or a sub-urban district
- o Urban, please specify
- o Sub-urban, please specify

6 What is your ethnicity?
- o Kinh
- o Hoa
- o Khmer
- o Chăm
- o Tày
- o Others, please specify

7 What is your religion?
- o None
- o Buddhism
- o Catholicism
- o Cao Đài
- o Hòa Hảo
- o Protestantism
- o Islam
- o Hinduism
- o Others, please specify

Q8 What is your sexuality?
- o Straight
- o Lesbian
- o Bisexual/Pansexual
- o Asexual

Q9 How many children do you have currently?

10 How many siblings do you have?

11 How many siblings does your mother have?

12 How many siblings does your father have?

14 In your opinion, how does our household's economic standard of living compare to other households in the commune/ward?
- o Well-off
- o Above average
- o Average
- o Below average
- o Poor

Block: Labor and human capital

15 Are you working?
- o No, I'm unemployed
- o No, I'm a student
- o Yes

16 Have you ever participated in the labor force?
- o No, not at all
- o Yes, in the past

17 How many years of working experience do you have?

18 What is/was your current/past job?

19 What is/was your employment sector?
- o Public
- o Private
- o International
- o Self-employed
- o Family business/Small trade (no business registration)
- o Others, please specify

20 Are/Were you working part-time or full-time?
- o Part-time
- o Full-time
- o Freelance

21 What is/was the educational level requirement of your current/past job?
- o No requirement
- o Below High school
- o High school
- o Vocational school
- o College
- o University
- o Master's degree
- o PhD's degree

22 What is/was your monthly earning from your current/last job?

23 What is the highest level of education that you have completed?
- o I did not go to school
- o Primary school
- o Secondary school
- o Highschool
- o Vocational school
- o College
- o University
- o Master's degree
- o PhD

24 How many years of education have you completed?

25 Do you intend to pursue another higher educational level?
- o No
- o Yes, please specify the level

26 What is your mother's level of education?
- o She did not go to school
- o Primary school
- o Secondary school
- o High school
- o Vocational school
- o College
- o University
- o Master's degree

o PhD's degree
o I don't know

27 What is your father's level of education?
o He did not go to school
o Primary school
o Secondary school
o High school
o Vocational school
o College
o University
o Master's degree
o PhD's degree
o I don't know

Block: Risk aversion regarding career

28 Do you consider going back to the labor force?
o No
o Yes

29 Do you perceive that the sector of your past/current/future job is male-dominated?
o No
o Yes

30 Do you perceive any wage gap between male workers and female workers in your past/current/future job?
o No
o Yes

31 Does your past/current/future job have any physique/beauty requirements?
o No
o Yes

32 Does your past/current/future your workplace/industry offer flexibility for childbearing and childrearing?
o No
o Yes

33 Do you see promotion opportunities in your current/future job?
o No
o Yes

34 Do you see personal development opportunities in your current/future job?
o No
o Yes

35 Do you see the potential for a raise in your current/future job?
o No
o Yes

36 Please rank from 1 to 5 for the following items in order of priority for your life (1 with the highest priority, 5 with the priority)
_____ Employment
_____ Financial wealth
_____ Physical and mental health
_____ Intellectual and educational pursuits
_____ Romantic relationships
_____ Family and (future) fertility

37 Please rate the likeliness of the following risks from Extremely unlikely , Somewhat unlikely , Neither likely nor unlikely , Somewhat likely and Extremely likely :
a) You will be fined after giving birth
b) Your income will be significantly reduced after giving birth
c) Your income growth will be hampered after giving birth
d) You will be degraded after giving birth
e) You will be delegated to a different position after giving birth
f) You will lose promotion opportunities during maternity leave/after giving birth
g) You will lose training opportunities during maternity leave/after giving birth
h) You will lose the physique/beauty requirements of your jobs while being pregnant/after giving birth
i) You will not be able to change jobs after giving birth
j) Your occupational skills be heavily impacted after giving birth

Block: Hypothetical situation

Imagine that you are the main income earner in the family, and you have a very good job with a guaranteed income for life. Your monthly wage is 60 million VND. However, you start to feel bored so you want to seek new challenges. Then you come across an opportunity of a new, equally good job. However, the income of this job is not stable.

38 Suppose that there is a 45% chance that your income would double (to 120 million VND) and a 55% chance that your income would be cut by 1/3 (to 40 million VND). Would you take the new job?
o No
o Yes

Q39 Suppose the chances were 43% that that your income would double (to 120 million VND), and 57% that your income would be cut by 50% (to 30 million VND). Would you still take the new job?
o No
o Yes

40 Suppose the chances were 47% that your income would double (to 120 million VND) and 53% that your income would be cut by 25% (to 45 million VND). Would you then take the new job?
o No
o Yes

41 Suppose the chances were 40% that your income would double (to 120 million VND) and 60% that it would be cut it by 62.5% (to 22.5 million VND), would you still take the new job?
o No
o Yes

42 Suppose the chances were 48% that your income would double (to 120 million

VND) and 52% that it would be cut it by 20% (to 48 million VND). Would you then take the new job?

o No
o Yes

Block: Expectations: Views on marriage and childbearing

43 What age did you get married
44 What age did your mother get married?
45 What age did your mother give birth to the first child?
o I don't know
o Age:
46 What age did your mother give birth to the last child?
o She only had one child
o I don't know
o Age:
47 Are you in a romantic relationship at the moment?
o No
o Yes
48 Do you intend to get married or remarry in the future?
o No
o Yes
49 Why do you not intend to get married? Please select all answers that apply.
☐ Focused on career
☐ Bad past relationships
☐ Financial reasons
☐ No trust in marriage
☐ Lifestyle
☐ Others, please specify
50 At what age do you intend to get married or remarry?
51 In general, what age do you think is the LATEST to get married?
52 In general, at what age do you think women normally get married nowadays?
53 What conditions do you think are necessary to get married? Please select all answers that apply.
☐ Reached the desired age to get married
☐ Completed the desired educational level
☐ Have a stable job with an adequate income
☐ Be emotionally mature
☐ Meet health conditions
☐ Have/rent your own house
☐ Have enough money to hold the wedding
☐ Have a sufficient amount of savings
☐ Find the right partner through matchmaking
☐ Have a romantic partner and a long enough relationship
☐ Bored of single life
☐ Others, please specify
54 Which of these necessary conditions do you find the most difficult to achieve?
55 Do you intend to have (more) children?
o No
o Yes
56 Why do you not want to have (more) children? Please select all answers that apply.
☐ Simply no desire
☐ Career concerns
☐ Environment/ Climate change concerns
☐ Unsafe living environment/institutional environment
☐ Personal health-related reasons
☐ Lifestyle
☐ Family history-related reasons
☐ Financial difficulties
☐ I want but my partner/husband doesn't want to have (more) children
☐ I am not confident in my ability to raise and educate my children
☐ I have enough children already, please specify the number
☐ Others, please specify
57 How many biological children do you intend to have?
58 At what age do you intend to have the first child?
59 At what age do you plan to have your last child?
60 In general, how many children on average do you think women have nowadays?
61 In general, what age do you think women normally have their first child nowadays?
62 In general, what age do you think women today normally have their last child nowadays?
63 In your opinion, what is the ideal birth-spacing gap?
64 Do you have any gender preference for your children?
o No
o Yes, I prefer sons
o Yes, I prefer daughters
65 Do you think being married is a necessary condition for having children?
o No
o Yes
66 Do you intend to become or Are you a single mother?
o No
o Yes, I intend so
o Yes, I am
67 How important is fertility to you?
o Not at all important
o Slightly important
o Moderately important
o Very important
o Extremely important
68 Do you have any fertility-related problems?
o No
o Yes
o I don't know
69 Can you please specify the fertility-related problems that you have? (Optional)

70 In your opinion, what age is the average woman most fertile in your opinion?
o 18–28 years
o 29-34 years
o 35-38 years
o At more than 38 years
71 In your opinion, what age does the average woman start experiencing a decline in fertility?
o 18–28 years
o 29-34 years
o 35-38 years
o At more than 38 years
72 Do you know how many children the government currently encourages each couple to have?
o No policy exercised
o Give birth to only one child
o One or two children
o Fully 2 children
o More than 2 children
o I know that there's a policy, but I don't know how many children are allowed
o I'm not aware of such policies
73 If you give birth to a 3rd child or more, how would you be penalized by the authorities, agencies or organizations? Please select all answers that apply.
☐ No penalty
☐ Get fined
☐ Salary deduction
☐ Being disciplined
☐ Loss of position
☐ Criticized
☐ Warned
☐ Others, please specify
74 Would such a fine make you not dare to have a third child (if you wanted)?
o No
o Yes
o It depends
o I don't know
75 Which following contraception methods have you used? Please select all answers that apply.
☐ I am not sexually active
☐ Do not use
☐ Calculate the menstrual cycle
☐ Pill
☐ Withdrawal
☐ Condom
☐ IUD
☐ Contraceptive patch
☐ My partner has had vasectomy
☐ Others, please specify
76 Have you ever had an unwanted pregnancy?
o Never
o Yes, once
o Yes, more than once

Block: Awareness of EF and WTA

78 Have you ever heard of egg freezing by choice?
o No
o Yes
79 How did you first learn about egg freezing by choice? Please select all answers that apply.
☐ Friends
☐ Family
☐ Internet/Social media
☐ TV/Magazine/Newspaper
☐ Obstetricians/Gynecologists/Medical doctors
☐ Others, please specify
80 Does the information give you the impression that motherhood at an older age is a viable option?
o No
o Yes
81 In your opinion, what is the ideal age for egg freezing?
o 18–28 years
o 29–34 years
o 35–38 years
o At more than 38 years
82 Do you think that there is a social stigma surrounding egg freezing by choice?
o No
o Yes
83 At what age do you think a woman is too old to attain pregnancy with frozen eggs?
o 18–28 years
o 29–34 years
o 35–38 years
o At more than 38 years
84 Please rank the following items in your order of choice preference (1 for the most preferred and 5 for the least preferred)
• Natural conception
• Assisted reproduction technologies (IVF, donated eggs, freezing embryos,,..)
• Adoption
• Surrogacy
• I do not want to have children
85 In general, do you consider egg freezing treatment as a viable childbearing planning option?
o No
o Yes
86 How likely do you consider freezing your eggs to increase the security of your reproductive future?
o Extremely Unlikely
o Unlikely
o Neutral
o Likely
o Extremely likely
87 How likely are you willing to adopt EF treatment as a viable childbearing planning option in case you cannot have any biological children of your own?
o Extremely Unlikely
o Unlikely
o Neutral

o Likely
o Extremely likely

88 Will you recommend EF treatment for other women in case they cannot naturally conceive?

o No
o Yes